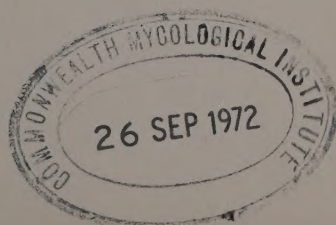


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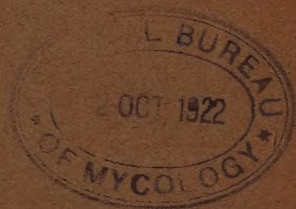
OHIO BIOLOGICAL SURVEY

BULLETIN 12

VOLUME III, No. 2

THE FIMETARIALES OF OHIO

ROBERT STRATTON



NOVEMBER, 1921

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THE FIMETARIALES OF OHIO

By

ROBERT STRATTON

INTRODUCTION*

Although some knowledge of the *Fimetariales* had been gained by special work as an undergraduate student in 1914, actual work for the preparation of this paper was not begun until the fall of 1916. Since only one species, *Fimetaria fimicola*, belonging to this order has been reported for Ohio, so far as is known by the author, it seemed desirable to determine how numerous these plants were in this area. While the chief aim was to catalogue the species found, yet, the author, unless otherwise stated, has completely rewritten the descriptions from his own data with careful attention, of course, to the diagnoses given by others.

Profiting by the knowledge gained by Griffiths, namely, that by using moist chambers, cultures of the more delicate forms, which would ordinarily escape observation in the field, as well as the more hardy ones, could be obtained in the laboratory from material collected in any locality, letters were sent in the fall of 1914 to about thirty-five botanists and friends living in different parts of the state. They were asked to send old dry material of different kinds of dung. Replies were received from about ten, of whom only a few sent material.

Old material was especially mentioned in the letters because the experience of previous workers has shown that it is the most productive when placed under proper conditions for the development of these fungi. This is probably true for two reasons: (1) the older the material, the more likely it is to contain spores of one or more species; (2) crops produced by successive intervals of moisture cover the substratum with spores so that each successive production is heavier than the previous one.

In the work of 1914 the author not only gained some idea of the group as a whole and the manner of obtaining material, but also became familiar with about ten different species of the group. No attempt, however, was made at that time to describe the species or to make sketches of them. Thus these species had to be restudied for the present paper and descriptions had to be made.

The following friends and botanists have contributed material from the localities designated: Miss Cora March, Wyoming, per Wm. Schaeffer and Fred Brater; Maximilian Braam, Cincinnati; E. L. Moseley, Sandusky; M. E. Stickney, Granville; W. G. Stover, Oxford, Columbus, and Buckeye

*Contributions from the botanical laboratory of Miami University.—XVII.

Lake; Bruce Fink, Peebles, Eaton, and Mason; Robert Gordon, Eaton; Chas. P. Fox, Mt. Peace, near Akron; A. E. Black, Oxford; Wm. A. Stratton, Sardinia; and Chas. R. Stevenson, Stout.

The illustrations given were made to show the form and structure of each plant as to its chief parts and thus to be a means of aiding the student in determining or recognizing the different species. All drawings were outlined and as many of the details as possible were put in by means of the camera lucida. A Leitz microscope with a tube length of 160 mic., a Leitz ocular micrometer, whose scale had been measured by means of a Bausch & Lomb stage micrometer ruled in tenths and hundredths of a millimeter, and a Bausch & Lomb camera lucida with the mirror bar at 110° , and the camera mirror at 50° , were used with the paper at the level of the table. Unless otherwise stated, perithecia are magnified 79 diameters and hairs, paraphyses, asci, and spores, 450 diameters. Some features could not be represented easily by the use of the camera lucida. For instance, the hairs of the perithecia, when very numerous, had to be drawn quite diagrammatically.

Most of the figures were made from living material. This has both advantages and disadvantages. It has the advantage of being more truthful, but the disadvantage of being less usable since many of the characteristics are lost by desiccation and most observers see them in the dry condition. It was the desire of the author to make drawings of the perithecium, hairs, paraphyses, asci, and spores for each species; but, for lack of time and material, this could not be done for many of the species.

Specimens could not in all cases be preserved on account of scarcity of material for some species. Rough microscopic mounts of most of the species were made, but these will not preserve many of the delicate parts, such as the appendages of the spores or even the paraphyses and asci. The illustrations may compensate for this deficiency to a certain degree.

All defects of this paper must be attributed either to the author's lack of time or to his inability to obtain all the references necessary to make the publication more accurate, especially with reference to the new species found. The author is greatly indebted to Mr. C. G. Lloyd, of Cincinnati, for the use of his reference library and also to his librarian, Miss Edith Wycoff, for her kind assistance. Acknowledgments are also due to all who so kindly contributed material. Thanks are due especially to Dr. Bruce Fink, under whose directions the work was done, for valuable suggestions and criticism.

DISTRIBUTION

No region thus far explored for these plants has failed to furnish a large number of species belonging to this order. Spegazzini has reported a large number of species from the South American countries; Fries and

Karsten, from the Scandinavian countries; Phillips, Plowright, Cooke, and Vize, from the British Isles; Zopf, Zukal, Winter, and others, from Central Europe, especially Germany; Saccardo and others, from Italy; Griffiths, Seaver, Thaxter, Harkness, Ellis & Everhart, Miss Palliser, and others, from North America. Although each of these regions has furnished species not yet reported from the others, nevertheless, there is a striking similarity in this portion of the flora of all the regions thoroughly studied.

Many of the species described in this paper have never been collected in the field so far as is known, yet they will usually be found in abundance, if cultures are made in moist chambers. This is due in part to the fact that many people never look for them at all, but chiefly to the fact that many of these plants are extremely delicate and do not develop except under the most favorable conditions of moisture. When drouth conditions return, they become so collapsed and disfigured that only the most careful and experienced observer will recognize them. On the other hand the substrata on which these plants grow are collected almost invariably in a perfectly dry state, which is the least promising condition for their detection, even if present in good condition. As illustrations, *Pleurage vestita* and *P. zygospora* may be used. The former reported as rare in Germany, and the latter from Italy alone, have been found to be very common in this country. Some species have been found growing at an altitude of 5000 ft., e. g., *Fimetaria bombardioides*.

METHODS

The dry material furnished by friends or collected by the author was placed upon blotting paper in a Petri dish, after which it, together with the blotting paper, was thoroughly moistened. If necessary, the material was moistened again from time to time. This paper is based chiefly upon cultures made in this way between September, 1916, and July, 1917. The blotting paper used kept the moisture in the Petri dish more uniform and also served as a substratum for many of the species, especially for those belonging to the genera, *Chaetomium* and *Fimetaria*. Usually the material was examined both at the time of starting the culture and also the following day for specimens that might be present on the material when it was collected. Species of *Agaricaceae* which developed in abundance in some dishes were removed. Other writers have reported that molds gave them much trouble; but these did not cause the author so much trouble as the Algae, which usually developed in each culture. Their slow development, however, rendered them of no serious difficulty. It seemed that molds were more prevalent on material collected in the winter, while algae were more numerous upon that obtained in the summer.

Dried specimens, as well as rough microscopic mounts, were kept for as many species as possible. In a few cases, where only a small number of plants developed for the particular species, all the material was used in

the microscopic study. Since no method has been developed to preserve the gelatinous appendages of the spores, and since the paraphyses and asci of many species are so evanescent, the mounts were made as follows: the material was mounted in water, which was gradually removed with blotting paper and was replaced by 100% alcohol. This was followed in the same way with xylol. After most of the xylol had been removed, balsam was added and the cover-glass applied. By this method, the perithecia and hairs as well as the spores and their arrangement in the asci could usually be preserved for some time.

The following two methods given by Griffiths could not be tried for lack of time and materials: by the one method the object is mounted in a drop of two per cent. aqueous solution of chrome alum on the flat slide, sufficient pressure being placed on the cover to rupture the perithecia, the superfluous liquid being wiped off; the cover is then sealed immediately with marine glue: by the other method the objects are mounted in water and arranged as desired; then a drop of dilute glycerine is placed at the edge of the cover and allowed to stand for two or three days before sealing. Griffiths says that the glycerine mounts are less liable to loss owing to imperfect sealing than the others; but they have the disadvantage of showing less detail, which is highly objectionable with such delicate structures.

The author did not attempt to obtain pure cultures until the year was half gone; but in the remaining time he was able to grow several different species on ordinary potato hard agar, in pure culture, either by transferring the spores ejected upon the sterile lid of the Petri dish, or by making two or three succeeding cultures each one from the preceding. Usually by the last method a pure culture could be obtained in the second transfer.

Since this paper deals largely with a survey of the species found in Ohio, little time could be given to the development of the different species, however interesting this may be. So far as noted, the observations agreed with those found by Griffiths, and therefore need not be repeated. At the end of each description, however, the date of collecting the material and the time when growth was obtained are given. It was thought that this might be of interest in telling how old were the spores that still retained the power to germinate after withstanding the desiccating influence of the laboratory. Griffiths has shown that spores of *Fimetaria fimicola* will remain in a normal condition over three and one-half years under the desiccating influence of laboratory temperatures and germinate. He also produced eight crops of the same species in seventy-five days, each succeeding crop being produced from spores of the preceding one.

The structure of these plants and the part this plays in spore dissemination is another phase that time will not permit to be developed in this paper.

ORDER FIMETARIALES

Perithecia superficial or deeply sunken in the substratum, usually without stroma, but, when the latter is present, perithecia immersed with the necks slightly protruding, subglobose, ovoid or flask-shaped, dark-colored, black or nearly so, occasionally dark-brown, smooth and naked or thickly clothed with bristle-like or flexuous hairs which are simple or branched and often overtop the perithecia forming a dense tuft; perithecial wall thin, membranous to coriaceous. Paraphyses persistent or evanescent. Asci 4-many-spored, evanescent and scarcely visible in mature plants, or persistent but delicate. Spores simple or compound, often surrounded with a hyaline gelatinous and rather evanescent envelope or with a long apiculus at each end, usually dark-colored, yellow to olivaceous, dark-brown or black, the compound spores often deeply constricted at the septa. Plants growing on decaying materials of various kinds, especially on the dung of animals.

Perithecia overtopped with a dense mass of hairs; paraphyses and asci evanescent.

Family 1. *Chaetomiaceae*

Perithecia not overtopped with hairs; paraphyses and asci persistent but delicate.

Family 2. *Fimetariaceae*

FAMILY 1. CHAETOMIACEAE.

Perithecia scattered or gregarious, superficial, free or adnate, generally seated on a superficial mycelium, usually with an ostiolum at the apex, pale-brown to black, with a thin, membranous wall, thickly clothed with hairs, the basal ones functioning as rhizoids, the apical ones usually longer and coarser, branched or simple, forming a tuft. Paraphyses evanescent. Asci clavate, evanescent, seldom visible in a mature specimen. Spores simple, ellipsoid or ovoid to subglobose, more or less compressed, usually more or less apiculate at the ends, with a cup-like depression on one side which causes them to appear spindle-shaped or narrowly ellipsoid in profile. Species all saprophytic, infesting a firm rather moist substratum, such as decaying parts of plants or dung of animals.

1. *CHAETOMIUM* Kunze & Schmidt, Myk. Hefte 1: 15. 1817.

Ascotricha Berk. Ann. Nat. Hist. 1: 257. 1838.

Perithecia superficial, usually with an ostiolum, and having an apical tuft of hairs or bristles covering the exposed surface of the thin and membranous wall; asci club-shaped, evanescent; spores simple, hyaline to dark-brown, more or less compressed.

Type species, *Chaetomium globosum* Kunze.

Apical hairs all simple.

Hairs flexuous.

Hairs circinate or subcircinate.

Hairs circinate and not swollen at the base.

1. *C. murorum*

Hairs not circinate.

Hairs numerous, olivaceous, 500-1000 mic. long. 2. *C. olivaceum*

Hairs more or less spirally coiled.

Hairs irregularly and spirally twisted at the end, straight at the base and incrustated. 3. *C. spirochaete*

Hairs more or less regularly coiled at the end in 4-10 spirals, pale-brown.

4. *C. bostrychodes*

Apical hairs all or partly branched.

Hairs all branched.

Hairs more or less deeply incrustated, 700-900 mic. long. 5. *C. elatum*

Hairs branched and simple.

Hairs smooth or slightly incrustated. 6. *C. funicola*

1. *Chaetomium murorum* Corda, Ic. Fung. 1: 24. 1837.

Perithecia more or less gregarious, subglobose or globose, with short, papilliform ostiolum, *(sometimes collapsing, 150-250 mic. in diameter), dark-brown, membranous; apical hairs simple, curved, (often 1mm. in length), 5 mic. thick, septate, smooth or slightly granular, subhyaline to dark-brown or almost black, circinate at the ends; lateral hairs simple, bent upward at the middle, 500 mic. long, 6 mic. thick at the base, septate, smooth, except the base, subulate, dark-brown at the base to paler at the tip, less numerous than the apical; paraphyses not observed; asci broad clavate, short-stipitate, slightly immature ones 38-56x11-19 mic., 8-spored, very evanescent; spores irregularly arranged, bright olive-green, ellipsoid, apiculate at both ends, 12-16x7-8 mic.

HABITAT: On dead poplar, dry grass, and goat and rabbit dung.

DISTRIBUTION: New York to Ohio and Montana; also in Europe.

ILLUSTRATIONS: Pl. I, f. 1-8; Corda, Ic. Fung. 1: pl. 7, f. 293, B; 2: pl. 13, f. 103; Nova Acta Acad. Leop.-Carol. 42: pl. 19, f. 13-20.

TYPE LOCALITY: Prague, Bohemia.

DISTINCTIVE CHARACTER: Circinate apical hairs.

*Notes: That part of the description in parentheses is taken from Miss Palliser. Plants cultivated in the laboratory, Feb. 10, 1917, on rabbit dung collected by Wm. Schaeffer, near Wyoming, Oct. 3, 1914.

2. *Chaetomium olivaceum* Cooke & Ellis, Grevillea 6: 96. 1878.

Perithecia scattered or gregarious, broadly ovoid or ellipsoid, often pointed at the base, 200-305x175-250 mic., in fresh condition olivaceous but in dry specimens dark-brown, opaque, membranous, thickly and evenly clothed with slender, flexuous hairs; apical hairs simple, flexuous, often 700 mic. long, rarely 1000 mic., 3-4 mic. thick, somewhat coarser than the others, sparingly septate, minutely scabrous, in fresh condition pale-olivaceous, in dry condition light-brown; paraphyses filiform, longer than the asci and mixed with them; asci clavate, broadly rounded above and narrowed below into a comparatively slender stipe, spore-bearing part 35-50x12-15 mic., 8-spored; spores irregularly crowded at the tip of

the ascus, ranging from hyaline when young to yellow-brown at maturity, globose-ellipsoid, slightly apiculate at both ends, 9-13x8-10 mic.

HABITAT: On various dead plants, moist wood, rye-straw, paper, pasteboard, old broom, etc.

DISTRIBUTION: Maine to Ohio, Kansas, and Texas.

ILLUSTRATIONS: Pl. I, f. 9-11; Grevillea 6: pl. 100, f. 38.

TYPE LOCALITY: Newfield, New Jersey.

DISTINCTIVE CHARACTERS: Yellow-brown spores and flexuous, olivaceous hairs of uniform diameter, changing to light-brown in drying, minutely scabrous to almost smooth.

Note: Plants collected by the author on an old broom, at Oxford, Oct. 3, 1913.

3. *Chaetomium spirochaete* Palliser, N. Amer. Flora 3: 61. 1910.

Perithecia more or less gregarious, ellipsoid, 250-300x190-230 mic., dark-brown, often appearing black, opaque, thin, brittle, thickly clothed with hairs; apical hairs simple, numerous, often forming a densely entangled, dark, spherical mass 800 mic. in diameter, straight for about 350 mic. from the base, then becoming extremely flexuous or irregularly spirally twisted several times, 3-5 mic. thick at the base, septate, more or less thickly incrustated, toward the end becoming paler and less incrustated, although scabrous throughout or becoming smooth at the tip, dark-brown; basal and lateral hairs simple, flexuous, 3 mic. thick, sparingly septate, smooth, pale-brown; paraphyses not observed; asci broadly clavate, 30-52 x 11-15 mic., 8-spored; spores forced into a globular mass at the tip of the asci by the growth of younger asci, hyaline to brown, broadly limoniformis, slightly apiculate at either end, 7-11x6-9 mic.

HABITAT: On moist decayed paper, wheat-straw, cotton root in a moist chamber, and quail dung.

DISTRIBUTION: New Jersey to Ohio and Iowa.

ILLUSTRATION: Pl. I, f. 12-20.

TYPE LOCALITY: Ames, Iowa.

DISTINCTIVE CHARACTERS: Simple, incrustated hairs, straight at the base and irregularly and spirally twisted at the end.

Note: Plants collected by the author on paper in a tub at Oxford, Oct. 4, 1913, and on wheat-straw near Georgetown, Dec. 3, 1916; also grown in the laboratory, May 19, 1917, on quail dung collected by the author near Georgetown, Dec. 28, 1916; on potato hard agar, March, 1917, several cultures.

4. *Chaetomium bostrychodes* Zopf, Sitz.-ber. Bot. Ver. Prov. Brand. 19: 173. 1878.

Perithecia gregarious or scattered, broadly ovoid or subglobose to fusoid, 160-350x145-220 mic., light gray in fresh condition, brown when dried, opaque, thin, membranous, covered with hairs having fine sandy granules intermixed at base; apical hairs simple, straight for 260-320 mic., then coiled 4-10 times in a more or less regular spiral 18-36 mic. in diameter, extending 305 to 540 mic. above the perithecium, 3-5 mic.

wide at the base, septate, scabrous throughout or smooth apically, pale-brown; lateral and basal hairs simple, curved towards the tip and tapering, about 215×3.5 mic., septate, scabrous at the base, yellow-brown, paler or colorless towards the tip, tips broken off usually when old; paraphyses simple, stout, not numerous, much longer than the asci and mixed with them, septate, not so evanescent as the asci; asci clavate, with a stipe .3 to .5 length of asci, small, $35-48 \times 10-14$ mic., 8-spored, very evanescent; spores irregularly arranged, hyaline or pale olive-green to pale olive-brown, broadly ellipsoid, almost globose, sometimes slightly apiculate, $6.7.5 \times 5.6$ mic.

HABITAT: Dung of dogs, sheep, chickens, and mice, old shoes, potatoes, and decaying portions of animals.

DISTRIBUTION: New York to Ohio and Louisiana; also in Europe.

ILLUSTRATIONS: Pl. I, f. 21-22 and pl. II, f. 1-8; Nova Acta Acad. Leop.-Carol. 42: pl. 20, f. 14-26.

TYPE LOCALITY: Berlin, Germany.

DISTINCTIVE CHARACTERS: Small pale olive-brown spores and 4-10 regular spirals of the apical hairs.

Notes: Asci were slightly immature when measured, since mature ones disappear.

Plants cultivated in the laboratory, Feb. 2, 1917, on mice dung, collected by W. G. Stover, in laboratory of Ohio State University, Columbus, Jan., 1915; also June 14, 1917, on paper in dish with cow dung collected by Bruce Fink, at Peebles, Oct. 28, 1913; June 21, 1917, on chicken dung collected by Chas. R. Stevenson, at Stout, Jan. 1, 1917; and June 26, 1917, on rabbit dung collected by the author near Georgetown, Dec. 3, 1916.

5. **Chaetomium elatum** Kunze, Schmidt & Kunze, Deuts. Schwamme 8: 3. 1818.

Chaetomium pannosum Wallr. Fl. Crypt. Germ. 2: 267. 1833.

Chaetomium glabrescens Ellis & Ev. Proc. Acad. Phila. 1893: 130. 1893.

Perithecia densely gregarious, or scattered and simple, subglobose or ovoid, or sometimes top-shaped, $220-425 \times 190-365$ mic., dark-brown to black, opaque, brittle and easily crushed, thickly clothed with hairs; apical hairs often forming a black spherical mass 900 mic. in diameter, consisting of rough, septate, deeply incrustated bristles, more or less irregularly or dichotomously branched at the end usually 2-5 times, being widest generally at the point of branching, 5-9 mic. wide there and 4-7 mic. at the base, with the terminal branches which are often 350 mic. long before they are crushed or broken off abruptly in drying, black or dark-brown and incrustated at the base, tapering and gradually becoming smooth and hyaline at the tip; lateral hairs few, simple, curved, short, 5 mic. thick, septate, smooth or slightly incrustated, hyaline to light-brown; basal rhizoids flexuous, 3-4 mic. thick, sparingly septate, smooth, pale red-brown to dark-brown; paraphyses and asci not observed; spores hyaline to olivaceous-brown, ellipsoid, apiculate at both ends, $9.14 \times 7.5-9$ mic.

HABITAT: On packing straw, maple log, Indian corn, decaying cottonwood stick, barrel stave, manure, straw hat, dead petioles of *Washingtonia*, dead grass, old broom, etc.

DISTRIBUTION: United States and Canada; also Europe.

ILLUSTRATIONS: Pl. I. II, f. 9-12; Nova Acta Acad. Leop.-Carol. 42: pl. 17, f. 14-26; pl. 18, f. I-II; Grev. Scot. Crypt. Fl. pl. 230.

TYPE LOCALITY: Germany.

DISTINCTIVE CHARACTERS: Branched, rough, deeply incrusting, apical bristles.

Note: Plants collected by the author on an old broom, at Oxford, June 16, 1917.

6. **Chaetomium funicola** Cooke, Grevillea I: 176. 1873.

Chaetomium setosum Ellis & EV. Am. Nat. 31: 340. 1897.

Chaetomium bartholomaei Sacc. & Syd. in Sacc. Syll. Fung. 14: 490. 1899.

Mycelium superficial, white, branched, indistinctly septate; perithecia scattered or gregarious, broadly ovoid, 130-200x100-145 mic., dark-brown, opaque, thin, membranous, clothed on all sides with hairs; apical hairs of two kinds, simple and branched; simple hairs lanceolate, sometimes extending over 300 mic. above the perithecium, septate, tapering from the scabrous, dark-brown base to the smooth, or slightly scabrous, pale tip; branching hairs few in number or forming a mass 175 mic. above the perithecium, sometimes straight and simple for 160 mic., septate, usually scabrous throughout, dark-brown at the base to pale-brown at the tip, with numerous ramifications, sometimes regularly dichotomous, more often irregularly branched, branches 10-20 mic. long; lateral hairs simple, almost straight, comparatively short, 3-4 mic. wide, septate, tapering from the scabrous, pale-brown base to the smooth, hyaline tip; rhizoids simple, flexuous, slender, 2-5 mic. thick, non-septate, smooth, pale-brown; paraphyses and asci not observed; spores simple, pale olivaceous-brown, limoniformis, 3-7x3-4.5 mic.

HABITAT: On old broom, straw, and damaged hay.

DISTRIBUTION: New York to Ohio and Kansas.

ILLUSTRATION: Pl. II, f. 13-18.

TYPE LOCALITY: Albany, New York.

DISTINCTIVE CHARACTERS: Small perithecia, with both simple and branched hairs.

Notes: Mycelium on agar white at first, the center becoming pale-green to black, concentrically zoned with a gray zone between the center and the outside, the darker center bearing perithecia first; even the light outside zone is zoned.

Plants cultivated in the laboratory, March 23, 1917, on potato hard agar, the culture made Feb. 27, 1917, from specimen on straw, collected by the author, near Georgetown, Dec. 3, 1916.

FAMILY 2. FIMETARIACEAE.

Perithecia scattered or aggregated, superficial or deeply sunken in the substratum, and often erumpent at maturity, slightly transparent to black and opaque, with wall thin and membranous to coriaceous, usually without a stroma (true of all genera contained in this paper), but, if with stroma, the perithecia sunken with projecting papilliform beaks. Asci usually very delicate, surrounded by long paraphyses or intermingled with

them. Spores simple or compound, surrounded by a hyaline gelatinous envelope or ornamented with hyaline gelatinous apiculi, usually dark-colored. Plants entirely saprophytic and generally growing on dung.

Spores simple (except *Pleurage zygospora*).

Ascus perforate; spores partially or entirely surrounded by a hyaline, gelatinous envelope.

1. *Fimetaria*.

Ascus not perforate, but opening by the breaking off of the inelastic, ascus apex; spores ornamented by secondary, gelatinous appendages, with or without primary ones.

2. *Pleurage*.

Spores compound.

Spores 2-celled

3. *Delitschia*.

Spores 4-many-celled

4. *Sporormia*.

1. FIMETARIA Griffiths & Seaver.

Sordaria Ces. & De-Not. Comm. Critt. Ital. 1: 225, in part. 1863.

Perithecia superficial or sunken, dark and opaque, membranous or coriaceous; asci with an apical perforation and stretching at maturity; spores simple, usually dark-brown and wholly or partially fugacious envelope.

Type species, *Sphaeria fimicola* Roberge.

Perithecia not hairy or bristly.

Asci 4-spored

1. *F. tetraspora*.

Asci 8-spored

2. *F. humana*.

Spores obovoid, acutely rounded below.

Spores subglobose or ellipsoid.

Spores subglobose, small, 5-10x3-7 mic.

3. *F. minima*.

Spores ellipsoid, larger, 16-25x11-13 mic.

4. *F. fimicola*.

Perithecia hairy or bristly.

Spores ellipsoid, not conspicuously flattened.

5. *F. pilosa*.

Spores ellipsoid, conspicuously flattened.

6. *F. discospora*.

1. *Fimetaria tetraspora* Sp. Nov.

Mycelium more or less superficial, white, sparingly branched, septate, with hyphae 2-3 mic. in diameter; perithecia scattered or aggregate, sunken, globose to ovate-globose, with a projecting, papilliform beak, 350-440x305-395 mic., black, opaque, thin, membranous; paraphyses simple, stout, somewhat ventricose below and tapering upward, not numerous, not mixed with the asci but surrounding all the asci as a whole, equaling or longer than the asci, septate, persistent; asci cylindrical, contracted below into a straight or crooked stipe, 100-145x13-17.5 mic., 4-spored, evanescent; spores 1-seriate, oblique or erect, ranging from hyaline when young through olivaceous to dark-brown and opaque, ellipsoid, rounded above, with a minute hyaline apiculus at the lower end which becomes brown and opaque in some spores making the spore sharp-pointed, 20-27x13-20 mic., with a narrow hyaline envelope swelling but slightly in water except that of the upper end of the apical spore which becomes much rounded out.

HABITAT: Quail dung and on paper.

DISTRIBUTION: Known only from type locality below.

ILLUSTRATION: Pl. III, f. 1-6.

TYPE LOCALITY: Georgetown, Ohio.

DISTINCTIVE CHARACTERS: 4-spored asci and hyaline apiculus at the lower end of each spore.

Note: Plants grown in the laboratory, May 25, 1917, on quail dung, (also spreading over paper in the Petri dish) collected by the author, near Georgetown, Dec. 28, 1916.

2. **Fimetaria humana** (*Fuckel*) Griffiths & Seaver, N. Amer. Flora 3: 67. 1910.

Sphaeria humana Fuckel, Fungi Rhen. No. 1801. 1866.

Hypocopra humana Fuckel, Symb. Myc. 241. 1869.

Perithecia scattered or aggregate in solid clusters, sunken or sometimes completely exposed at maturity, pyriform with a papilliform to cylindric beak, 365-450x230-310 mic., dark-brown to black, thin, membranous; paraphyses simple, ventricose, longer than the asci and not much mixed with them, septate, evanescent; asci cylindric, broadly rounded to truncate above and tapering below into a short, blunt stipe, (160-200) mic., 17-19 mic. Griffiths), 8-spored, somewhat persistent; spores obliquely 1-seriate, ranging from hyaline when young through olivaceous to dark-brown and opaque, obovoid, broadly rounded above and acutely so below, 18-23x12-17 mic., with a hyaline envelope covering the entire spore except the circular germ-pore at the lower end of the spore.

HABITAT: On human dung, and on dung of dogs, cows, goats, pigs, and hogs.

DISTRIBUTION: New York to Ohio, South Dakota, and Louisiana; also in Europe.

ILLUSTRATIONS: Pl. III, f. 7-11; Mem. Torrey Club 11: pl. 3, f. 16-18; pl. 4, f. 14-16.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTERS: Dark smooth pyriform perithecia and obovoid spores.

Note: Plants cultivated in the laboratory, March 14, 1917, on hog dung collected by Chas. R. Stevenson, at Stout, Jan. 1, 1917.

3. **Fimetaria minima** (*Sacc. & Speg.*) Griffiths & Seaver, N. Amer. Flora 3: 66. 1910.

Sordaria minima Sacc. & Speg.; Sacc. Michelia 1: 373. 1878.

Hypocopra minima Sacc. Syll. Fung. 1: 244. 1882.

Perithecia scattered or aggregate in clusters, superficial or more often with sunken base, pyriform to conic or globose with a papilliform to blunt and truncate beak, 145-290x145-225 mic., dark-brown to black, thin, membranous, with cellular structure usually invisible, covered on exposed portions with minute papillae or with aciculae and on the base with

branched, smooth, flexuous, septate, brown hairs, 3 mic. thick; paraphyses simple or sometimes branched or lobed at the tip, filiform but wide in comparison with the asci, old ones shriveling to half their original width and entwining about one another, equal to asci or slightly longer, septate; asci cylindric, broadly rounded to truncate above, slightly contracted below into a short blunt stipe, 50-90x5-9 mic., 8-spored, persistent; spores 1-seriate, prominently 2-guttulate when young becoming indistinctly so or homogeneous with age, hyaline when young, varying through olivaceous to dark-brown and opaque, ellipsoid to subglobose, 5-10x3-7 mic., surrounded by a hyaline fugacious envelope.

HABITAT: Paper, dung of cows, goats, and horses.

DISTRIBUTION: New Jersey, Ohio, and Europe.

ILLUSTRATIONS: Pl. III, f. 12-19; Mem. Torrey Club 11: Pl. 3, f. 25-27; Sacc. Fungi Ital. pl. 617.

TYPE LOCALITY: Italy.

DISTINCTIVE CHARACTERS: Small black papillate perithecia and small 2-guttulate spores.

Notes: Griffiths & Seaver give 150-180x100-150 mic. as size of the perithecia.

Plants cultivated in the laboratory, Jan. 12, 1917, on cow dung collected by Bruce Fink and Robert Gordon, near Eaton, April 10, 1914; also June 21, 1917, on horse dung collected by the author, near Georgetown, Sept. 14, 1914.

4. **Fimetaria fimicola** (Roberge) Griffiths & Seaver, N. Amer. Flora 3: 66. 1910.

Sphaeria fimicola Roberge; Desmaz. Ann. Sci. Nat. III. 11: 353. 1849.

Sordaria fimicola Ces. and De-Not. Comm. Critt. Ital. 1: 226. 1863.

Mycelium superficial and within the substratum, large hyphae, light-brown to dark-brown, small hyphae light colored, superficial mycelium arising from large hyphae that grow along the surface of the substratum, branched and septate; perithecia scattered, or aggregate into a layer which forms a complete covering for the substratum, usually sunken at first and erumpent later, or superficial from the first, pyriform with papilliform or slightly elongate black beak, 335-525x190-365 mic., light-brown or black, opaque, thin, membranous and brittle, with cellular structure usually plainly visible, smooth or slightly roughened on the beak with minute papillae, mycelium covering a large portion of the perithecium; paraphyses simple, ventricose, not numerous, longer than the asci, septate, not persistent; asci cylindric, broadly rounded to truncate, perforate at the apex and tapering below into a slender stipe, 140-225x15-20 mic., 8-spored, opening by apical pore, rather persistent; spores obliquely 1-seriate, varying in color from hyaline through light-yellow, yellow-green, olive-green to dark-brown and opaque, ellipsoid, rounded at the ends, but more acutely so below, 16-25x11-13 mic., with germ-pore, apical, circular and situated in the lower more acutely rounded end of the spore, the hyaline envelope not surrounding the entire spore but having its edges attached around the germ-pore, which it does not inclose on stretching.

HABITAT: Dung of horses, cows, goats, rabbits, sheep, and deer; also on old paper.

DISTRIBUTION: Vermont to Ohio and Oregon, southward to Alabama and Arizona; also in Europe.

ILLUSTRATIONS: Pl. IV, f. 1-6; pl. V, f. 1-3; Mem. Torrey Club 11: pl. 3, f. 19-21; pl. 4, f. 8-10.

TYPE LOCALITY: France.

DISTINCTIVE CHARACTERS: Dark, pyriform, smooth perithecia and ellipsoid spores.

Note: Plants collected by the author on an old broom, at Oxford, Nov. 11, 1916; also cultivated in the laboratory Feb. 24, 1917, on horse and rabbit dung collected by Chas. P. Fox at Mt. Peace, near Akron. Oct. 5, 1914; Feb. 27, 1917, on cow dung collected by Fred Brater, Sept. 28, 1914; March 5, 1917, on potato hard agar, specimen maturing in 9 days. Several cultures were grown but only one was timed.

5. **Fimetaria pilosa** sp. nov.

Perithecia scattered or gregarious, superficial, globose to pyriform with a papilliform, black, hairy beak, 175-320x145-250 mic., dark-brown to black and opaque, thin, membranous, with exposed surface covered by light-brown, septate hairs or bristles; paraphyses simple, filiform, numerous, equaling the asci and mixed with them; asci cylindric, rounded above and contracted below into a short, blunt stipe, 70-85x7-10 mic., 8-spored; spores 1-seriate, brown, ellipsoid, 10-12x6-7 mic., surrounded by a narrow, hyaline, evanescent envelope.

HABITAT: On rabbit dung.

DISTRIBUTION: Ohio.

ILLUSTRATION: Pl. IV, f. 7, 8.

TYPE LOCALITY: Buckeye Lake, Ohio.

DISTINCTIVE CHARACTERS: Hairy perithecia and size of spores.

Note: Plants cultivated in laboratory, June 20, 1917, on rabbit dung collected by W. G. Stover, Buckeye Lake, Sept. 27, 1914.

6. **Fimetaria discospora** (Auersw.) Griffiths & Seaver. N. Amer. Flora 3: 68. 1910.

Sordaria discospora Auersw.; Niessl, Verh. Nat. Ver. Brunn. 10²: 192. 1872.

Hypocopra discospora Fuckel, Jahrb. Nass. Ver. Nat. 27-28: 43. 1873.

Perithecia scattered, superficial or sunken, subglobose to pyriform with a truncate, conical beak, 250-425x190-290 mic., dark-brown to black and opaque, thin, membranous to coriaceous, having exposed portions covered with short, erect, hyaline to dark-brown or black, non-septate hairs; paraphyses simple, filiform, not numerous, usually longer than the asci, 3 mic. wide, septate, quite persistent; asci cylindric, broadly rounded to truncate and perforate above, and contracted below into a short, blunt stipe, 90-130x8-10 mic., 8-spored, persistent; spores usually obliquely 1-seriate in part, simple, varying from hyaline when young through olivaceous to brown, flattened, subcircular to broadly elliptic in one view, and narrowly elliptic in the other, 10-15x7-9 mic. side view,

or 5 mic. wide edge view, with a germ-pore extending nearly the entire length of the spore, and a hyaline envelope prominent when spores have been removed from the ascus, and quite persistent.

HABITAT: American specimens on dung of horses and cows; type on dung of hare.

DISTRIBUTION: Rhode Island to Ohio, Montana, Kansas, and Mississippi; also in Europe.

ILLUSTRATIONS: Pl. IV, f. 9-16; Mem. Torrey Club 11: pl. 3, f. 4-8; Grevillea 6: pl. 94, f. 2.

TYPE LOCALITY: Leipzig, Germany.

DISTINCTIVE CHARACTERS: Bristly hairs of the perithecia and comparatively large spores.

Notes: Griffiths and Seaver give perithecia 270x220 mic., asci 75-130x13-21 mic., and spores 10-18x8-11 mic.

Plants grown in the laboratory, Feb. 7, 1917, on horse dung collected by the author at Oxford, Nov. 2, 1913.

2. PLEURAGE Fries, Summa Veg. Scand. 418. 1849.

Schizothecium Corda, Ic. Fung. 2: 29. 1838. Not *Schizotheca* Ehrenb. 1832.

Perithecia superficial or sunken, membranous or coriaceous; paraphyses ventricose or filiform-tubular, usually longer than the asci and agglutinate; asci without an apical perforation, stretching at maturity; spores ellipsoid, with or without primary appendages, but always having attached to them at maturity two or more hyaline, gelatinous, secondary appendages of variable length.

Type species, *Schizothecium fimicola* Corda.

Asci 4-spored.

Primary appendages of spores reduced to a small triangular apiculus.

1. *P. taenioides*.

Primary appendages of spores elongate and cylindric.

2. *P. anserina*.

Asci 8-spored.

Primary spore-appendages present.

Perithecia hairy above the substratum.

Beak hairy.

Hairs agglutinate and consisting of bunches of irregular cells.

Spores 2-seriate.

3. *P. conica*.

Hairs short, scattered or in tufts.

Hairs scattered.

Hairs bristly, light-brown, tipped with a colorless cell.

4. *P. amphicornis*.

Hairs not bristly, hyaline throughout.

5. *P. hyalopilosa*.

Hairs in tufts.

6. *P. immersa*.

Beak naked, black.

Spores consisting of a fertile cell at each end of a long, hyaline filament.

7. *P. zygospora*.

Spores simple with usually four gelatinous appendages at each end.

8. *P. vestita*.

- Perithecia naked above the substratum. Spores completely covered by secondary appendages. 9. *P. longicaudata*.
 Primary spore-appendages absent. Spores 2-seriate. 10. *P. multicaudata*.
 Asci more than 8-spored.
 Perithecia hairy above the substratum.
 Hairs short, forming tufts of irregular cells. 11. *P. dakotensis*.
 Hairs long and single.
 Hairs straight and more or less clustered. 12. *P. curvicolla*.
 Hairs flexuous and similar to the mycelium. 13. *P. collapsa*.
 Perithecia naked above the substratum. Secondary spore-appendages easily distinguishable at maturity. 14. *P. pleiospora*.

1. **Pleurage taenioides** D. Griff. Mem. Torrey Club 11: 58. 1901.

Sordaria taenioides Sacc. Syll. Fung. 17: 602. 1905.

Perithecia scattered, half-sunken, globose to pyriform-conic with a long, cylindric, curved or twisted, black beak, 845-935x435-630 mic., slightly olivaceous when young, but becoming dark-brown to black, transparent when young, showing spores in the asci, becoming opaque, membranous to slightly coriaceous at maturity, covered uniformly on all exposed portions by simple, straight, septate, smooth, brown, hyaline-tipped, fugacious hairs of 2-4-cells, 25-40x3-4 mic; paraphyses simple, filiform, tapering upward, numerous, longer than the asci and mixed with them, septate, evanescent; asci cylindric, broadly rounded above and contracted below into a long, slender, crooked stipe 342x37.5 mic., 4-spored, evanescent; spores 1-seriate, ranging from hyaline when young through pale-yellow, olivaceous to dark-brown and opaque, long ellipsoid to ovoid, acutely rounded below, 30-60x22-28 mic., with the primary appendage reduced to a minute, hyaline or often slightly colored apiculus at the lower end of the spore and with secondary gelatinous appendages, the lower one being very long, attached apically to the spore, inclosing the minute apiculus, easily resolved into two closely united portions which appear to lose their individuality distally and which at first are thrown into convolutions at the base resembling segments of the tape-worm, these disappearing when it elongates, the upper appendage being slightly smaller than the lower, eccentrically attached and also having convolutions at first.

HABITAT: On dung of horses, cows, rabbits, burros, dogs, and sheep.

DISTRIBUTION: Rhode Island to Ohio, South Dakota, Arizona, and Alabama.

ILLUSTRATIONS: Pl. V, f. 4-8; Mem. Torrey Club 11: pl. 6, f. 1-3.

TYPE LOCALITY: New York City.

DISTINCTIVE CHARACTERS: Large spores, minute apiculus, and long convoluted appendages at maturing time.

Notes: From the material at hand, the author was able to measure only one ascus accurately and a few perithecia, in most of which the asci had disappeared.

Plants cultivated in the laboratory, June 19, 1917, on rabbit dung collected by Wm. A. Stratton, at Sardinia, Dec. 29, 1916.

2. **Pleurage anserina** (Ces.) Kuntze, Rev. Gen. Plant. 3³: 504. 1898.

Sphaeria anserina Ces., Rab. Hedwigia 1: 116, as synonym. 1857.

Malinvernina anserina Rab. Hedwigia 1: 116. 1857.

Mycelium superficial, hyaline to brown, branched, septate; perithecia scattered uniformly or aggregate, usually half-sunken but often entirely superficial, pyriform, with beak papilliform or slightly cylindric and usually curved, 500-730x190-380 mic., black above with a tinge of green below due to young spores, opaque, thin, membranous, smooth except portions of the beak which bear tufts of hairs which are simple, straight, 140-290x3-4 mic., sparingly septate, smooth, light-brown to pale towards the tip, persistent; paraphyses simple, filiform or slightly ventricose below, decreasing in diameter upward, numerous, 1.5-2 times the length of the asci, septate, indistinct at time spores are mature; asci cylindric, slightly contracted and rounded above, and contracted below into a long, slender, often crooked stipe, 175-305x22-30 mic., 4-spored, opening by a cap-like lid, quite persistent; spores generally obliquely 1-seriate, ranging from hyaline when young through olivaceous to dark-brown and opaque, ellipsoid, 27.5-40x15-17.5 mic., terminated below by a short hyaline primary appendage 1-1.5 times the length of the spore, this as well as the apex of the spore terminated by a long lash-like, gelatinous appendage of variable length, which by proper illumination can be resolved into 2 closely united strands which gradually merge into one another distally, primary appendage persisting longer than secondary appendages, often found on mature spores.

HABITAT: On dung of horses, cows, sheep, rabbits, and dogs; also on old pasteboard and Chinese mats.

DISTRIBUTION: Vermont to Ohio, South Dakota, and New Mexico; also in Europe.

ILLUSTRATIONS: Pl. VI, f. 1-10; Hedwigia 1: pl. 15, f. 4; Mem. Torrey Club 11: pl. 5, f. 4-6.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTERS: Dorsal tufts of long hairs and 4-spored asci.

Notes: Griffiths and Seaver give perithecia 400-500x300-350 mic., asci 200-400x17-22 mic. and spores 34-42x18-20 mic.

Plants cultivated in the laboratory, Feb. 10, 1917, on rabbit dung collected by Wm. Schaeffer, near Wyoming, Oct. 3, 1914; also June 13, 1917, on cow dung collected by the author, near Georgetown, Sept. 7, 1914; on potato hard agar from March 21, to April 2, 1917, maturing in 12 days or less.

3. **Pleurage conica** (Fuckel) Griffiths & Seaver, N. Amer. Flora 3: 72. 1910.

Sordaria curvula De Bary, Morph. Phys. Pilze 209, hyponym. 1866.

Cercophora conica Fuckel, Symb. Myc. 245. 1869.

Perithecia scattered, with base slightly sunken, pyriform-conic with a short, black, conical, papilliform beak containing a prominent ostium, 450-875x190-410 mic., hyaline to light-brown, transparent, thin, mem-

branous, cellular structure being plainly visible, with exposed portions more or less covered with bunches of agglutinate, obliquely septate, hyaline to light-brown, constricted hairs which are more or less prominent around the beak, but diminish in size and prominence downward; paraphyses ventricose, agglutinate, longer than the asci and not much mixed with them; asci clavate, contracted above and tapering below into a moderately long, slender, straight or crooked stipe, 175-245x25-32.5 mic., 8 spored, evanescent; spores 2-seriate, ranging from hyaline when young through olivaceous to dark-brown and opaque, ellipsoid to ovoid, 19-23x10-15 mic., with a cylindric, straight or curved primary appendage, .5 to .7 the length of the spore, which as well as the apex of the spore is tipped with a long, lash-like, gelatinous, secondary appendage, varying in length with the stage of development, the upper being excentrically placed and both being made up of 2 closely united filaments which are plainly distinguishable proximally but which appear to fuse together distally.

HABITAT: On dung of horses, cows, goats, sheep, pigs, and rabbits.

DISTRIBUTION: New York to Ohio, Montana, Arizona, and Alabama; also in Europe.

ILLUSTRATIONS: Pl. VII, f. 1-5; Mem. Torrey Club 11: pl. 7, f. 1-6.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTERS: Agglutinated hairs of perithecia and 2-seriate arrangement of spores.

Note: Plants cultivated in the laboratory, April 2, 1917, on horse dung collected by Chas. R. Stevenson, at Stout, Jan. 1, 1917.

4. **Pleurage amphotornis** (Ellis) Kuntze, Rev. Gen. Plant. 3³: 505. 1898.

Sphaeria amphotornis Ellis, Bull. Torrey Club 6: 109. 1876.

Sphaeria eximia Peck, Ann. Rep. N. Y. State Mus. 28: 78. 1876.

Perithecia scattered, or sometimes in rows of 3 to 5, superficial or with base slightly sunken, ovoid to ovoid-conic with a short, flat, papilliform, black ostium, 670-830x510-670 mic., dark-brown to black, membranous to coriaceous, with thick, pale-brown, somewhat transparent wall, cell-walls showing as white lines over the surface which is covered sparingly with simple, straight, septate, smooth, pale-brown, hyaline-tipped, persistent hairs 25-130x3-4 mic., composed of 2-8 cells, apical one hyaline; rhizoids simple or branched, almost straight, 3-5 mic. thick, sparingly septate, smooth, pale-brown; paraphyses usually simple, filiform, numerous, about equaling the asci and mixed with them, septate, shriveling up and disappearing at maturity of the spores; asci clavate, contracted and rounded above, and tapering below into a short, usually crooked, stipe-like base, 200-300x30-40 mic., 8-spored, rather persistent; spores 2-seriate, 4 and 4 or 5 and 3, ranging from hyaline when young through olivaceous-brown to dark-brown and opaque, ellipsoid, somewhat

sharply rounded at the ends, 23-33x14-18 mic., with a straight, cylindric primary appendage, about .3 to .7 as long as the spore and with long, lash-like gelatinous secondary appendages attached to the apex of the spore and the tip of the primary appendage, and composed of 2 closely united filaments which soon disappear after maturity of the spore.

HABITAT: On rabbit dung.

DISTRIBUTION: Ontario to New Jersey and Ohio.

ILLUSTRATIONS: Pl. VII, f. 6-8 and pl. VIII, f. 1-4, Ann. Rep. N.Y. State Mus. 28: pl. 2, f. 14-17; Mem. Torrey Club 11: pl. 7, f. 11-13.

TYPE LOCALITY: Newfield, New Jersey.

DISTINCTIVE CHARACTERS: Hairy superficial perithecium small papiliform beak and spore appendages.

Notes: Griffiths gives 450-600x350-400 mic. for the size of the perithecia. My measurements were taken without cover-glass and represent the actual size of the plants found.

Note: Plants cultivated in the laboratory, June 15, 1917, on rabbit dung, collected by Chas. R. Stevenson, at Stout, Jan. 1, 1917.

5. **Pleurance hyalopilosa** sp. nov.

Perithecia scattered, superficial or slightly sunken, pyriform with a short, straight or curved, black beak, 465-760x350-480 mic., somewhat pale olive-green below when young, becoming light-brown or dark-brown, transparent, thin, membranous, with beak and exposed portions covered with simple, smooth, indistinctly septate, hyaline hairs, evenly scattered or in tufts; paraphyses ventricose, septate, not mixed with asci; asci clavate-cylindric, rounded above and narrowed below into a long, crooked stipe, slightly immature ones 155-275x17.5-28 mic., expanding at maturity to 55-65 mic. wide, 8-spored; spores 2-seriate, ranging from hyaline when through olivaceous to dark-brown and opaque, ellipsoid, 19-33x14-20 mic., terminated below with a cylindric primary appendage usually as long or longer than the spore and which is tipped with a long, lash-like, gelatinous secondary appendage composed of 2 closely united filaments which become indistinguishable distally, while attached to the apex of the spore are 2-4 gelatinous appendages which seem to fuse together distally.

HABITAT: On dung of horses and cows.

DISTRIBUTION: Ohio.

ILLUSTRATION: Pl. VIII, f. 5-9; pl. IX, f. 1-4.

TYPE LOCALITY: Oxford, Ohio.

DISTINCTIVE CHARACTERS: Hyaline hairs covering exposed parts of the perithecia, and the spore appendages.

Note: Plants cultivated in the laboratory, Jan. 27, 1917, on horse dung collected by Bruce Fink, at Mason, Aug. 10, 1914, and July 5, 1917, on cow dung collected by the author, at Oxford, Oct. 22, 1914.

9. **Pleurance immersa** sp. nov.

Perithecia scattered, sunken, pyriform with a short, black, cylindric or conic, projecting beak, 730-890x380-585 mic., pale-brown, transparent,

spores and asci being visible through the wall, thin, membranous, with a few bunches of straight, light brown, sparingly septate hairs, about 75×2.3 mic., on the beak; paraphyses simple, ventricose, numerous, longer than the asci and not mixed with them, septate, evanescent; asci clavate, rounded and contracted above, and narrowed below into a short stipe, about 325×62.5 – 87.5 mic. expanded or 262 – 315×40 – 57 mic. contracted, 8-spored, evanescent; spores 2-seriate, ranging from hyaline when young through olivaceous to dark-brown and opaque, ovoid to oblong ellipsoid, 30 – 55×19 – 25 mic., with a long, cylindric, usually curved primary appendage below and with secondary appendages covering the entire surface of the spore.

HABITAT: On cow dung.

DISTRIBUTION: Ohio.

ILLUSTRATION: Pl. IX., f. 5-8.

TYPE LOCALITY: Near Georgetown, Ohio.

DISTINCTIVE CHARACTERS: Long curved primary appendages and secondary appendages covering only the entire surface of the spore proper.

Note: Plants cultivated in the laboratory, June 27, 1917, on cow dung collected by the author, near Georgetown, Sept. 7, 1914.

7. **Pleurance zygospora** (*Speg.*) Kuntze, Rev. Gen. Plant. 3³: 505. 1898.

Sordaria zygospora Speg. *Michelia* 1: 227. 1878.

Philocopra zygospora Sacc. *Syll. Fung.* 1: 251. 1882.

Mycelium more or less superficial, pale-brown, (dingy white to the naked eye) branched, septate, with hyphae 3 mic. in diameter; with hyphae 3 mic. in diameter; perithecia scattered, sunken or nearly superficial, pyriform with a more or less elongate, cylindric, black, bare and curved beak, 685 – 1080×465 – 730 mic., slightly green to brown below and black above, somewhat transparent, thin, membranous, covered below with an arachnoid mycelium; paraphyses simple, ventricose, tapering upward, rather numerous, longer than the asci and not mixed with them, septate, agglutinate; asci clavate, broadly rounded above and contracted below into a long, slender, crooked stipe, 250 – 365×35 – 60 mic., 4 to 8-spored, very evanescent; spores 2-seriate to irregular, consisting of an ellipsoid to ovoid fertile cell, usually rounded at both ends, but more acutely so distally, at each end of a long, spirally arranged hyaline to brown, fugacious filament which corresponds to the primary appendage in the other species, with terminal fertile cells 19 – 45×10 – 23 mic., ranging from hyaline when young through olivaceous to dark-brown and opaque and which have secondary appendages consisting of usually 4, rather short, tapering, hyaline, gelatinous, widespread processes attached to the distal ends of the fertile cells and sometimes to both ends.

HABITAT: On dung of horses, cows, goats, sheep, and pigs.

DISTRIBUTION: New York to Ohio, South Dakota, Texas, and Louisiana; also in Europe.

ILLUSTRATIONS: Pl. X, f. 1-5; Mem. Torrey Club 11: pl., 9. f., 1-4.

TYPE LOCALITY: Italy.

DISTINCTIVE CHARACTER: Spores consisting of a fertile cell at each end of a long twisted filament.

Notes: The smaller dimensions given for the asci represent measurements taken from slightly immature ones while the larger dimensions were from mature swollen forms. This species is very variable. Occasionally fertile cells were found which were very narrow and oval in outline. Sometimes only one fertile cell is developed, in which case it is very large and irregular in shape. Some spores were found in which the entire filament joining the fertile cells had been transformed into a brown solid structure resembling that of the spore proper. Occasionally spores were found with many secondary appendages covering the entire distal half of the fertile cells.

Plants cultivated in the laboratory, Feb. 1, 1917, on cow dung collected by Fred Brater, at Summit, near Cincinnati, Sept. 28, 1914, and June 22, 1917, on horse dung collected by the author near McGonigles, Oct. 13, 1916.

8. **Pleuraea vestita** (Zopf) D. Griff. Mem. Torrey Club 11: 76. 1901.

Sordaria vestita Zopf, Zeits. Naturw. 56: 556. 1883.

Podospora vestita Wint. in Rab. Krypt. Fl. 1²: 176. 1887.

Perithecia scattered, usually more or less sunken, but often quite superficial, pyriform with a black, bare, curved or straight, cylindric beak, 525-700x350-440 mic., black above but light-green below, especially in the sunken portions which are so transparent that the asci and spores can be seen rather distinctly, thin, membranous, usually with a dense growth of branched, septate, light-brown mycelium, composed of hyphae 2 mic. in diameter and covering the perithecia up to the beak; paraphyses simple, ventricose, soon shriveling, longer than the asci, evanescent; asci clavate, contracted and rounded above and tapering below into a medium-sized, straight or crooked pedicel, 275-375x60-80 mic. expanded, or 185-240x27-5-45 mic. not expanded, 8-spored, evanescent; spores 2-seriate, 4 and 4 or 5 and 3, ranging from hyaline when young through olivaceous to dark-brown and opaque, ellipsoid to ovoid, 25-40x15-25 mic., with a cylindric primary appendage below as long as the spore or slightly longer, which is tipped with from 1 to 4, usually 4, long, gelatinous appendages similar to the 4 found at the apex of the spore.

HABITAT: On dung of horses, cows, sheep, rabbits, and pigs; also on wheat-straw and dead culms of *Eleocharis*.

DISTRIBUTION: New York to Ohio, Oregon, Arizona, and Louisiana; also in Europe.

ILLUSTRATIONS: Pl. X, f. 6-7 and pl. XI, f. 1-6; Mem. Torrey Club 11: pl. 9, f. 5-8.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTERS: Light-brown mycelium and the 4 gelatinous secondary spore appendages at both the apex of each spore and the tip of its primary appendage.

Note: Plants cultivated in the laboratory, Dec. 16, 1916, on horse dung, collected by Bruce Pink, at Mason, Aug. 10, 1914; Jan. 20, 1917, on wheat-straw collected by the author, near Georgetown, Dec. 3, 1916; and May 1, 1917, on horse dung collected by Chas. R. Stevenson, at Stout, Jan. 1, 1917.

9. **Pleurage longicaudata** D. Griff. Mem. Torrey Club 11: 81. 1901.
Sordaria longicaudata Sacc. Syll. Fung. 17: 601. 1905.

Perithecia scattered, sunken, but becoming half-exposed in time, globose to pyriform with a short cylindric, black, bare beak, 640-960x395-480 mic., slightly green and transparent below when young, but finally becoming black and opaque, thin, membranous; paraphyses simple, tubular-ventricose, irregular, tapering upward, rather numerous, slightly longer than the asci, septate, soon shriveling and disappearing with age; asci clavate, straight or curved, contracted and rounded above, and tapering below into a long, narrow stipe, 365-435x45-85 mic. expanded, or about 250-300x38-45 mic. contracted, usually 8-spored, sometimes 4-spored, evanescent; spores 2-seriate when 8 or 1-seriate when 4, ranging from hyaline when young through olivaceous or pale-brown to dark brown and opaque, ellipsoid, rounded at the ends, but usually more acutely so above, 27.5-46x15-30 mic., with pestle-shaped or cylindric primary appendages, usually equalling the spore in length and with secondary appendages attached to the tip of the primary and covering the entire spore, being shortest around the equator and increasing in length toward the ends where they may appear to become united into a fugacious, hyaline, gelatinous, striate-frayed filament, but usually at the upper end there are 4 or more separate appendages much longer than the lateral ones.

HABITAT: On cow dung.

DISTRIBUTION: Ohio to Kansas, Texas, and Alabama.

ILLUSTRATIONS: Pl. XI, f. 7-9 and pl. XII, f. 1-3; Mem. Torrey Club 11: pl. 8, f. 9-11.

TYPE LOCALITY: Rooks County, Kansas.

DISTINCTIVE CHARACTER: The spore appendages.

Notes: There seems to be considerable variance in the size and shape of the spores. A few spores were found which were almost globose in shape. The author was unable to obtain spores outside of the asci which had the apical appendages in perfect condition. These were observed largely in the asci. It was thought that the striations were due to the crushing together of the secondary appendages into a single appendage apparently.

Plants cultivated in the laboratory, June 23, 1917, on cow dung collected by Bruce Fink and Robert Gordon, at Eaton, April 10, 1914.

10. **Pleurage multicaudata** D. Griff. Mem. Torrey Club 11: 85. 1901.
Sordaria multicaudata Sacc. Syll. Fung. 17: 603. 1905.

Perithecia scattered, sunken with only the beak projecting, or superficial, pyriform to globular with a papilliform to cylindric, black, straight or curved beak 670-875x465-730 mic., dark-brown or black and opaque, slightly coriaceous, with the beak covered on all sides, or if curved only on the convex side, with bunches of straight, dark-brown, sparingly septate hairs of various lengths, reaching 875 mic., and with the lower portion uniformly clothed with long, flexuous, branched, brown, septate, rhizoid-like hairs; paraphyses simple, wide, tubular-ventricose, equaling

the asci and not mixed with them, septate, not persistent; asci clavate, straight or curved, contracted and rounded above and tapering below into a long, narrow, crooked stipe, 275-350x42-65 mic., 8-spored, persistent; spores 2-seriate, 4 and 4 or 5 and 3, ranging from hyaline when young through olivaceous or yellow-brown to dark-brown and opaque, ellipsoid to oblong, rounded at both ends 40-50x19-23 mic., without primary appendages, but with secondary appendages forming short, gelatinous, very fugacious, hyaline projections covering the entire spore and being longest at the ends of the spore but never reaching a length equal to it.

HABITAT: On dung of horses and cows.

DISTRIBUTION: Ohio to South Dakota and Mississippi.

ILLUSTRATIONS: Pl. XII, f. 4-9; Mem. Torrey Club 11: pl. 6, f. 7-9.

TYPE LOCALITY: Highmore, South Dakota.

DISTINCTIVE CHARACTERS: The tufts of hair on the beaks of the perithecia and the beautiful, large, ellipsoid spores covered with short appendages at maturity.

Notes: In one case a tuft of hair rising from the base of the beak was 1550 mic. long, becoming a single hair for the last 475 mic.

Plants cultivated in the laboratory, June 21, 1917, on horse dung collected by the author, near Georgetown, Sept. 14, 1914.

11. **Pleurage dakotensis** D. Griff. Mem. Torrey Club 11: 87. 1901.
Philocopra dakotensis Sacc. Syll. Fung. 17: 607. 1905.

Perithecia scattered, sunken or superficial, pyriform with a papilliform to cylindric, black, curved or crooked beak, 600-875x300-555 mic., light-brown, transparent, thin, membranous, with exposed portions covered by tufts of agglutinate, obliquely-septate, light-brown hairs which usually disappear with age; rhizoids branched, flexuous, 2.5 mic. in diameter, septate, smooth and light-brown; paraphyses simple, slightly ventricose, numerous, longer than the asci, but not mixed with them, septate, evanescent, asci clavate, broadly rounded and contracted above, and contracted below into a short, crooked, stipitate base, 200-270x30-67 mic., 260-295x55-95 mic. expanded, 32-spored, rather persistent; spores in several series, ranging from hyaline when young through olivaceous to dark-brown and opaque, ellipsoid to slightly ovoid, 18-23x12-15 mic., with a short, cylindric, straight, fugacious primary appendage below and with a long, lash-like, very fugacious secondary appendage tipping both the primary and the apex of the spore.

HABITAT: On dung of cows and rabbits; also on dead stems of *Salsola tragus* L.

DISTRIBUTION: New Jersey to Ohio, South Dakota, Texas, and Alabama.

ILLUSTRATIONS: Pl. XIII, f. 1-4; Mem. Torrey Club 11: pl. 7, f. 17-19.

TYPE LOCALITY: Brookings, South Dakota.

DISTINCTIVE CHARACTERS: 32-spored asci, and agglutinated hairs covering the projecting beak and exposed portions of the perithecium.

Notes: My measurements of perthecia—although made without cover-glass—and of asci were greater than those made by Griffiths, but our spore measurements agree.

Plants cultivated in the laboratory, June 19, 1917, on rabbit dung collected by Wm. A. Stratton, Sardinia, Dec. 29, 1916; also June 26, 1917, on rabbit dung collected by the author, near Georgetown, Dec. 3, 1916.

2. **Pleurage curvicolla** (Wint.) Kuntze, Rev. Gen. Plant 3³: 505. 1898.

Sordaria curvicolla Wint. Hedwigia 10: 161. 1871

Philocopra curvicolla Sacc. Syll. Fung. 1: 250. 1882.

Mycelium superficial, gray, branched, septate, with hyphae 1-2 mic. in diameter, perithecia, scattered or gregarious, sunken, but often erumpent and half superficial at maturity, pyriform with a black, projecting, rather stout, cylindric, straight or curved beak, 395-655x250-450 mic., light-brown, transparent, thin, membranous, ornamented on the lower half of the beak with bunches of simple, nearly straight, acuminate, long, septate, smooth, hyaline to light-brown, persistent hairs; paraphyses not observed*; asci widely clavate to sac-like, broadly rounded above and contracted below into a short stipe, 200-230x70-100 mic., 128-256-spored, rather persistent; spores in many series, ranging from hyaline when young through pale-olivaceous to dark-brown and opaque, ovoid to ellipsoid, 11-22x9-14 mic., terminated below by a short primary appendage*.

HABITAT: On dung of horses, cows, and rabbits.

DISTRIBUTION: New York to Ohio, Montana and Alabama; also in Europe.

ILLUSTRATIONS: Pl. XIII, f. 5-12; Bull. Torrey Club 26: pl. 365, f. 13-15; Mem. Torrey Club 11: pl. 10, f. 1-6.

TYPE LOCALITY: Germany.

DISTINCTIVE CHARACTERS: Tufts of hairs on the perithecia, and the large number of small spores.

*Notes: Griffiths and Seaver give "paraphyses tubular to filiform tapering upwards, septate, longer than the asci"; they also state that the apex of the spore and the primary appendage are each tipped with a long, lash-like gelatinous, hyaline, very fugacious, secondary appendage. My material was too old to observe these, only the primary appendages being present in a few.

Plants cultivated in the laboratory, 1914, on rabbit dung collected by Bruce Fink, Peebles, Oct. 24, 1913; also April 4, 1917, on horse dung collected by Charles R. Stevenson, Stout, Jan. 1, 1917; and May, 1917 on potato hard agar by transferring the spores ejected upon the lid of the Petri dish containing the Stout material.

13. **Pleurage collapsa** D. Griff. Mem. Torrey Club 11: 89. 1901.

Philocopra collapsa Sacc. Syll. Fung. 17: 607. 1905.

Perithecia scattered or aggregate, sunken, pyriform to subglobose, with a papilliform to short, cylindric, black beak, 450-500x400-450 mic., pale-green below at first but soon becoming brown, thin, membranous, with the exposed portion, surrounding the base of the beak, covered with long, flexuous, septate, brown hairs; paraphyses ventricose, agglutinate, longer than the asci, but not much mixed with them, evanescent; asci clavate to fusiform contracted and sharply rounded above and contracted

below into a short, blunt stipe, *210-225x30-50 mic., 64-spored, evanescent; spores in several series, ranging from hyaline when young through olivaceous to dark-brown and opaque, ellipsoid and broadly rounded at the ends, 15-21x10-14 mic., with a primary appendage that is very long and slightly clavate when young, but at maturity is very much shriveled and indistinguishable from the short, blunt secondary appendages which terminate it and the apex of the spore.

HABITAT: On rabbit dung.

DISTRIBUTION: New York to Ohio and Alabama.

ILLUSTRATIONS: Pl. XIV, f. 1-4; Mem. Torrey Club 11: pl. 10, f. 14-18.

TYPE LOCALITY: New York City.

DISTINCTIVE CHARACTERS: Hairy perithecia, 64-spored asci and character of primary appendages.

*Note: Measurements of asci were made from old material and thus not expanded but contracted. Plants cultivated in the laboratory, Dec. 8, 1916, on rabbit dung collected by the author, near Georgetown, Sept. 14, 1914.

14. **Pleurage pleiospora** (Wint.) Kuntze, Rev. Gen. Plant. 3^d: 504. 1898.

Sordaria pleiospora Wint. Hedwigia 10: 161. 1871.

Philocopra pleiospora Sacc. Syll. Fung. 1: 249. 1882.

Perithecia scattered, sunken but becoming more or less free with age, pyriform with a papilliform to somewhat elongate, cylindric, black, bare, usually curved beak, 500-700x375-525 mic., dark-brown, somewhat transparent when young, thin, membranous, the whole surface of the perithecium, except the tip of the beak, and of the substratum covered with long, flexuous, septate, smooth, pale-brown hairs; paraphyses simple, rather stout, ventricose, longer than the asci, septate, evanescent; asci clavate to fusiform, contracted and narrowly rounded above and contracted below into a short, narrow, usually crooked, stipitate base, 310x65 mic., 64-spored, but at times appear to be less, evanescent; spores in several series, ranging from hyaline when young through olivaceous to dark-brown and opaque, ellipsoid, rounded at both ends but usually more broadly so below, 27.5-40x15-20 mic., with a clavate to cylindric primary appendage, equal to or longer than the spore, the base surrounded with 2-several hyaline, gelatinous secondary appendages varying in form and size, the apex of the spore being crowned by a tuft of very fine filaments closely united into a short, blunt, straight or curved appendage.

HABITAT: On dung of horses and cows.

DISTRIBUTION: New York to Ohio, Mississippi and Alabama; also in Europe.

ILLUSTRATIONS: Pl. XIV, f. 5-8; Mem. Torrey Club 11: pl. 10, f. 7-10.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTER: The spore appendages.

Note: Measurement for asci was taken from a slightly immature one since no mature forms were found in the material, they being very evanescent. Saccardo gives 208-300x70-120 mic. for size of asci; Griffiths, 250-300x60-110 mic.

Plants cultivated in the laboratory, April 26, 1917, on horse dung collected by Chas. R. Stevenson, at Stout, Adams Co., Jan. 1, 1917. A culture growth on potato hard agar was obtained from these plants.

3. *DELITSCHIA* Auersw. Hedwigia 5: 49. 1866.

Perithecia superficial or sunken, dark-brown to black and opaque, thin and membranous to thick and coriaceous, hairy or smooth; asci 8 or 16-spored with an internal membrane which generally ruptures on a plainly marked constriction just below the apex; spores 2-celled, dark-brown and opaque, usually with a gelatinous envelope.

Type species, *Delitschia didyma* Auersw.

Asci 8-spored.

Spores obliquely septate, 2 seriate.

1. *D. leporina*.

Spores transversely septate, small, with hyaline envelope.

Beak long-cylindric and hairy.

2. *D. vulgaris*.

1. ***Delitschia leporina***. Griff. Mem. Torrey Club 11: 101, 102. 1901.

Perithecia scattered, sunken, pyriform to short-cylindric or conic, with a broad, truncate, projecting, rough or warty beak which is uniformly covered with long, flexuous, delicate, brown, septate hairs, 625-700x350-555 mic., dark-brown to black and opaque, thin, membranous; paraphyses simple or branched, filiform, numerous, longer than the asci and mixed with them, septate, persistent; asci clavate, broadly rounded above and contracted below into a short, blunt stipe, 255-325x30-40 mic., 8-spored, persistent; spores 2-seriate, 2-celled with a deep, rather broad constriction, ranging from hyaline when young through yellow to dark-brown and opaque, rather narrowly ellipsoid, acutely rounded at the ends, 47.5-65x15-19 mic., with a linear germ-pore along wall of each cell and with a hyaline, rather persistent envelope which expands greatly in water and is evidently septate and broadly constricted similar to the spore.

HABITAT: On rabbit dung.

DISTRIBUTION: New Jersey and Ohio.

ILLUSTRATIONS: Pl. XV, f. 1-7; Mem. Torrey Club 11: pl. 13, f. 14-16.

TYPE LOCALITY: Fort Lee, New Jersey.

DISTINCTIVE CHARACTERS: 2-seriate, obliquely septate and deeply constricted spores.

Notes: Some spores were found measuring as much as 40-72x15-25 mic. Griffiths gives size of perithecia at 600-750x500 mic., asci 240-295x30-34 mic., and spores 40-65x16-20 mic.

Plants cultivated in the laboratory, May 4, 1917, on rabbit dung collected by* the author at Oxford, Oct. 22, 1914.

2. ***Delitschia vulgaris*** D. Griff. Mem. Torrey Club 11: 104. 1901.

*Perithecia scattered, sunken, subglobose to pyriform, with a long, cylindric, curved or twisted beak which is densely covered with short,

wavy, brown, sparingly septate hairs, 600-750x375-450 mic., brown to black and opaque, thin, membranous; paraphyses filiform, septate, abundant, longer than the asci and mixed with them; asci cylindric, broadly rounded above and contracted below into a stout, tapering stipe, 185-215 x24-27 mic., 8-spored, persistent; spores obliquely 1-seriate, 2-celled, ranging from hyaline when young through yellow to dark-brown and opaque, ellipsoid, broadly rounded at the ends, with a broad, shallow constriction, 27-30x13-16 mic., with a hyaline envelope prominent, swelling greatly in water and showing a striation continuous with the septum of the spore and with a germ-pore extending from each end of the spore over half-way to the septum.

HABITAT: On dung of horses and cows.

DISTRIBUTION: New York to Ohio and Alabama.

ILLUSTRATIONS: Pl. XV, f. 8-14; Mem. Torrey Club 11: pl. 14, f. 4-6.

TYPE LOCALITY: New York City.

DISTINCTIVE CHARACTERS: Long hairy beaks of perithecia and ellipsoid spores.

*Notes: Owing to the small amount of material at hand, the description had to be taken largely from that given by David Griffiths, especially all measurements. The author's measurements which were made were as follows: perithecia 685-1135x235 mic. and spores 27.5-30x12.5-13 mic. My material agreed with that of Griffiths in that only two or three perithecia were found on the same culture.

Plants cultivated in the laboratory, April 24, 1917, on horse dung collected by Chas. R. Stevenson at Stout, Jan. 1, 1917.

4. *SPORORIMA* De-Not. Mem. Accad; Torino II. 10: 342. 1849.

Perithecia sunken or less frequently superficial, globose or ovoid, with papilliform to cylindric beak, membranous to coriaceous and sometimes slightly brittle; asci cylindric to clavate with an internal membrane which is usually perforate at the apex; spores 4-many-celled, usually dark-brown and opaque, fusiform to cylindric, and surrounded by a hyaline gelatinous envelope.

Type species, *Sporormia fimetaria* De-Not.

Spores 4-celled.

Beak always small, papilliform or wanting.

Paraphyses few or entirely wanting. Spores dark-brown or black at maturity. 1. *S. minima*.

Paraphyses abundant. Spores narrowly cylindric.

Asci clavate, spores large. 2. *S. intermedia*.

Asci cylindric, spores small. 3. *S. leporina*.

Beak enlarged and tubercular. Plant and spores small. 4. *S. tuberculata*.

Spores more than 4-celled.

Spores 16-celled, united into a cylindric mass. 5. *S. fimetaria*.

Spores 10-15-celled with a very large cell in the upper spore of the ascus. 6. *S. herculea*.

1. *Sporormia minima* Auersw. Hedwigia 7: 66. 1868.

Sphaeria multifera Berk. & Rav.; Berk. Grevillea 4: 143. 1876.

Philocopa multifera Sacc. Syll. Fung. 1: 251. 1882.

Mycelium both within substratum and superficial, gray or mouse-

colored in mass, becoming brown, branched, septate; perithecia scattered, sunken, with the small papilliform beak projecting to the surface, later more or less erumpent with the beak disappearing almost entirely, leaving the perithecium simply perforate, globose to ellipsoid, 90-220x90-160 mic., dark-brown, opaque, thin, membranous; paraphyses simple, filiform, few or absent, about equal to the asci, septate, persistent; asci cylindric-clavate, broadly rounded above and contracted below into a short or almost sessile base, 65-110x13-18 mic., 8-spored, opening by a cap-like lid, rather persistent; spores in two or three series, 4-celled, ranging from hyaline when young through yellow to dark-brown and opaque, cylindric, straight or curved, rounded at the ends, deeply constricted and easily separable, especially at the middle, 26-34x5-6 mic., with hyaline envelope easily visible in water and septate corresponding with the septation of the spore, persistent.

HABITAT: On the dung of goats, horses, cows, sheep, rabbits, dogs, prairie dogs, and burros.

DISTRIBUTION: Vermont to Ohio, Oregon, Arizona, and Louisiana; also in Europe.

ILLUSTRATIONS: Pl. XVI, f. 1-5; A. Berl. Ic. Fung. 1: pl. 28, f. 4; Ellis & Ev. N. Am. Pyrenom. pl. 18, f. 6-9; Mem. Torrey Club 11: pl. 15, f. 16-18.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTERS: Small size of perithecia and few paraphyses.

Note: Plants collected by the author on cow dung, at Oxford, Oct. 1, 1913, and 5 miles south of Oxford, Oct. 14, 1916; also grown in laboratory, June 13, 1917, on potato hard agar from specimens on rabbit dung, collected by the author, at Oxford, Oct. 22, 1914.

2. *Sporormia intermedia* Auersw. Hedwigia 7: 67. 1868.

Perithecia scattered, sunken but becoming superficial sometimes, pyriform, 385-875x205-480 mic., dark-brown to black and opaque, coriaceous or often slightly brittle, covered even to the tip of the beak with simple, flexuous or bristle-like, septate, smooth, pale-brown hairs, the lower serving as rhizoids and being branched, or often with age the hairs disappear leaving only papillate projections as evidence of their presence; paraphyses sparingly branched, filiform, numerous, longer than the asci and mixed with them, septate, rather persistent; asci clavate-cylindric, broadly rounded above and contracted below into a short, blunt, usually curved base, 125-230x22-30 mic., 8-spored, opening by a thimble-like rupture when the perforate membrane becomes plainly visible, rather persistent; spores in 2-3 series, overlapping, 4-celled, ranging from hyaline when young through pale, olivaceous-yellow, pale-brown to dark-brown and opaque, cylindric, straight or slightly curved, broadly rounded at the ends and usually deeply constricted,

47.5-65x9-15 mic., having a hyaline envelope surrounding the entire spore, swelling greatly in water and showing striatious continuous with the septa of the spore.

HABITAT: On dung of rabbits, horses, cows, sheep, prairie dogs, and dogs.

DISTRIBUTION: Vermont to Ohio, Orègon, California, and Mississippi; also in Europe.

ILLUSTRATIONS: Pl. XVI, f. 6-13; Hedwigia 7: pl. 1, f. 4; A. Berl. Ic. Fung. 1: pl. 29, f. 2; Mem. Torrey Club 11: pl. 15, f. 19-21.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTERS: Broad large spores and usually hairy perithecia.

Notes: The size of the perithecia and of the spores were found to be larger than those previously reported for this species and the perithecia were covered with hairs except in older specimens, yet the author does not deem it wise to call this a new species since all other characteristics agree so well.

Plants cultivated in the laboratory, April 3, 1917, on horse dung collected by Chas. R. Stevenson, at Stout, Jan. 1, 1917.

3. *Sporormia leporina* Niessl, Oesterr. Bot. Zeits. 28: 96. 1878.

*Perithecia sunken and scattered or aggregate in small, loose clusters which become erumpent and form small elevations of the material of the substratum, which, on disintegrating, leaves the perithecia exposed, subglobose to ovoid, with a papilliform or conic beak, 200-225x150-180 mic., black and shining above, thin, membranous or often inclined to be brittle; paraphyses sparingly branched, filiform, constricted especially below, abundant, longer than the asci and mixed with them, septate; asci cylindric, broadly rounded above and contracted below into a short, blunt stipe, 105-135x12-16 mic., 8-spored; spores obliquely 2-seriate, 4 celled, ranging from hyaline when young through yellow to dark-brown and opaque, cylindric, deeply constricted, easily separable, rounded at the ends, 32-35x5-6 mic., with a hyaline envelope becoming prominent in water and evidently striate corresponding with the septation of the spores.

HABITAT: On rabbit dung; also cultivated on the dung of horses and cows.

DISTRIBUTION: New York, New Jersey, Ohio, and Ontario; also in Europe.

ILLUSTRATIONS: Pl. XVII, f. 1-3; A. Berl. Ic. Fung. 7: pl. 28, f. 3; Mem. Torrey Club 11: pl. 15, f. 22-24.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTERS: Small beak, cylindric asci, and cylindric comparatively short spores.

*Notes: Description is taken largely from that given by Griffiths, especially the measurements. The author found the following measurements for the small amount of material obtainable; perithecia 250-x220 mic., asci 125x13 mic., spores 30-37.5x5-6 mic.

Plants cultivated in the laboratory, April 5, 1917, on a straw in horse manure collected by Chas. R. Stevenson, at Stout, Jan. 1, 1917.

4. **Sporormia tuberculata** D. Griff. Mem. Torrey Club 11: 112. 1901.

Perithecia scattered, sunken, globose with a tubercular, enlarged, black beak, *375-395x300-320 mic., dark-brown to black and opaque, thin, membranous, cellular structure being visible; paraphyses branched, filiform, 2-3 mic. wide, shriveling to 1 mic., guttulate, numerous, equaling the asci and mixed with them, septate; asci clavate, broadly rounded above and contracted below into a rather long, narrow, crooked stipe, 150-155x15-16 mic., 8-spored, persistent; spores 2-seriate, 4-celled, pale-brown, cylindric, rounded at the ends, deeply constricted and easily separable, 32-38x6-7.5 mic., with a narrow, hyaline, rather persistent envelope, showing striations continuous with the septa of the spore.

HABITAT: On dung of goats and horses.

DISTRIBUTION: New Jersey to Ohio and Arizona.

ILLUSTRATIONS: Pl. XVII, f. 4-7; Mem. Torrey Club 11: pl. 15, f. 13-15.

TYPE LOCALITY: Fort Lee, New Jersey.

DISTINCTIVE CHARACTER: The enlarged, tuberculate beak of the perithecia.

*Notes: The measurements were based upon only a few specimens. Griffiths gives the following measurements: perithecia 375-450x225-275 mic., asci 100-130x11-13 mic. and spores 32.33x5.5-7 mic.

Plants cultivated in the laboratory, June 16, 1917, on horse dung, collected by Chas. R. Stevenson, at Stout, Jan. 1, 1917.

5. **Sporormia fimetaria** De-Not. Mem. Accad. Torino II. 10: 342. 1849.

Sphaeria fimetaria Rab; Klotzsch, Herb. Viv. Myc. 1733. 1853.

Perithecia scattered, sunken beneath the thin upper crust of the substratum through which the upper wall of the perithecium opens on the surface, globose, without any visible beak, the ostiolum being simply an opening in the wall of the perithecium, 90-145 mic. in diameter, brown, opaque, thin, membranous; paraphyses not observed (paraphyses sparingly branched, filiform, longer than the asci and mixed with them, septate, Griffiths); asci cylindric, broadly rounded above and contracted below into a rather broad, stout, stipitate base, 70-80x12-16 mic., 8-spored, persistent; spores parallel, firmly united into a cylindric, truncate mass in the center of the ascus, 16-celled with the end cells nearly twice the length of the others (Ellis & Ev. say 16-20-celled), brown, rod-shaped, 50-54x3.5-4 mic., the whole mass of spores surrounded by a very narrow hyaline envelope which does not adhere to the individual spores when isolated.

HABITAT: On dung of cows and sheep.

DISTRIBUTION: Vermont to Ohio, South Dakota, Texas, and Mississippi; also in Europe.

ILLUSTRATIONS: Pl. XVII, f. 8-11; A. N. Berl. Ic. Fung 1: pl. 37, f. 4. 1894; Mem. Torrey Club 11: pl. 17, f. 4-7.

TYPE LOCALITY: Europe.

DISTINCTIVE CHARACTERS: Fasciculated many-celled spores and small, sunken perithecia.

Notes: Plants found on cow dung after being placed in moist Petri dishes. The material was collected at Peebles by Bruce Fink, Oct. 28, 1913, and at Stout by Chas. R. Stevenson, Jan. 1, 1917.

6. *Sporormia herculea* Ellis & Ev. N. Am. Pyrenom. 135. 1892.

Mycelium superficial, salmon-colored, branched, septate; perithecia scattered, sunken, globose, with a projecting, black, cylindric beak which terminates in an enlarged, black, warty, irregularly expanded or even forked extremity sometimes 375x135 mic., 600-800x390-660 mic., black, opaque, membranous to coriaceous, sometimes inclined to be brittle; paraphyses simple, filiform, abundant, longer than the asci and mixed with them, septate, persistent; asci clavate or slightly fusiform, broadly rounded above and contracted below into a short, blunt stipe, 315-355x40-65 mic., 8-spored, quite persistent; spores obliquely 2-3-seriate, 10-15-celled, ranging from hyaline when young through yellow to dark-brown, fusiform at first but becoming more or less cylindric at maturity, rounded or subacute at the ends, deeply constricted and easily separable into individual cells, 125-155x16-20 mic., the second to the fifth cell from above in the upper spore of the ascus being much larger than any of the others, ordinary cells 12.5-17.5x12-20 mic., large cell 20x20-25 mic., hyaline envelope very evanescent.

HABITAT: On dung of cows and horses.

DISTRIBUTION: Rhode Island to Ohio and Texas.

ILLUSTRATIONS: Pl. XVIII, f. 1-9; Mem. Torrey Club 11: pl. 17, f. 1-3.

TYPE LOCALITY: Newfield, New Jersey.

DISTINCTIVE CHARACTERS: The peculiar beaks of the perithecia and the peculiar upper spore of an ascus.

Notes: Ellis & Everhart give the following measurements: perithecia 500-750 mic., in diameter, asci 250-342x50-60 mic., spores 112-152x14-16 mic; Griffiths & Seaver give: perithecia 440-550 mic. in diameter, asci 225-300x45-60 mic., spores 135-150x18-21 mic.

Plants cultivated in the laboratory, Oct. 16, 1916, on cow dung collected by the author, near Georgetown, Sept. 7, 1914.

GLOSSARY

Acicula (pl. aciculae), a needle-like or bristle-like spine or prickle.

Acicular, slender or needle-shaped.

Acuminate, having a gradually diminishing point.

Adnate, to grow attached the whole length.

Agglutinate, glued together.

Aggregate, collected together.

Apical, at or belonging to the apex, tip or summit.

Apiculus, a small apical point.

Arachnoid, like a cobweb, from an entanglement of fine white hairs.

Beak, a pointed projection.

Bristle, a stiff hair.

Circinate, coiled into a ring.

Clavate, club-shaped, thickened towards the apex.

- Conic**, having the shape of a cone as the carrot.
- Convolutions**, folds.
- Coriaceous**, leathery, tough.
- Dichotomous**, forked, parted by pairs.
- Ellipsoid**, an elliptic solid.
- Eruptent**, prominent as though bursting through the epidermis.
- Evanescent**, soon disappearing, lasting only a short time.
- Excentrically**, one-sided.
- Fascicled**, drawn into a close cluster or bundle.
- Filiform**, thread-like.
- Flexuous**, bent alternately in opposite directions, zigzag.
- Fugacious**, soon perishing or disappearing.
- Fuscous**, dusky, too brown for a gray.
- Fusiform**, thick, but tapering towards each end.
- Gelatinous**, jelly-like.
- Germ-pore**, a pit on the surface of a spore-envelope through which a germ-tube makes its appearance.
- Germ-tube**, a tubular process from a spore developing into a hypha, and then into a mycelium or promycelium.
- Gregarious**, growing in company, associated but not matted.
- Guttulate**, resembling drops of oil or resin.
- Homogeneous**, of the same kind or nature.
- Hyaline**, colorless or translucent. A glass-green.
- Immersed**, below the surface.
- Incrusted**, covered with a hard crust or coat.
- Limoniformis**, lemon-shaped.
- Mycelium**, the vegetative portion of the thallus of fungi, composed of hyphae.
- Olivaceous**, the color of a ripe olive.
- Ostium**, the opening through which spores escape from the perithecium.
- Ovoid**, an egg-shaped solid.
- Papilla** (pl. papillae), soft superficial glands or protuberances; aciculae.
- Papillate**, having soft superficial glands, protuberances, or aciculae.
- Papilliform**, shaped like a papilla; a small protuberance.
- Paraphyses**, sterile filaments occurring in the fruit-body.
- Perforate**, pierced through.
- Perithecium** (pl. perithecia), a receptacle or case enclosing spores which are naked or in asci.
- Persistent**, remaining beyond the period when parts of the same kind sometimes fall off or are absorbed.
- Profile**, in side view.
- Pyriform**, resembling a pear in shape.
- Remote**, scattered, not close together.
- Saprophytic**, living on dead organic matter.
- Scabrous**, roughened or rough to the touch.
- Septate**, divided by a partition.
- Septum**, (pl. septa), any kind of partition, whether a true dissepiment or not.
- Seriate**, disposed in a series of rows.
- Sessile**, without a stalk.
- Stroma**, a cushion-like body, on or in which the perithecia are immersed; a compound fungus-body.
- Subcircinate**, somewhat coiled into a circle.
- Subglobose**, nearly globular.

Substratum, the substance upon or within which a fungus grows.

Subulate, awl-shaped.

Superficial, lying on the surface, not deep in the substratum.

Truncate, as though cut off at the end.

Tuft, a waving or bending and spreading cluster; a clump.

Ventricose, swelling or inflated on one side.

BIBLIOGRAPHY.

- Auerswald, B.** *Delitschia* Awd., nov. gen. *egrege* *Sphaeriacearum simplicium* et; affinitate *Sordariarum* et *Amphisphaeriarum*. *Hedwigia*, 5: 49. 1866.
Die Sporormia Arten. *Hedwigia* 7: 65-70. pl. 1. 1868.
- Berlese, A. N.** *Icones Fungorum* 1: pl. 28, f. 3, 4; pl. 29, f. 2; pl. 37, f. 4. 1894.
- Cesati, V.** *Hedwigia* 1: 103. pl. 14, f. A. 1856.
- Cooke, M. C.** *British Fungi*. *Grevillea* 1: 176. 1873.
- Cooke, M. C. & Ellis, J. B.** *New Jersey Fungi*. *Grevillea* 6: 96. pl. 100, f. 38. 1878; 8: 16. 1879.
- Corda, A. C. I.** *Icones Fungorum* 1: 24. pl. 7, f. 293, B. 1837; 2: 29. pl. 13, f. 103. 1838.
- Desmazieres, J. B. H. J.** *Plantae Cryptogames*. *Ann. Sci. Nat.* III. 11: 353. 1849.
- Ellis, J. B.** *South Jersey Fungi*. *Bull. Torrey Club* 6: 109. 1876.
- Ellis, J. B. & Everhart, B. M.** *New Species of Fungi from Various Localities*. *Am. Nat.* 31: 340, 341. 1897.
North American Pyrenomycetes, 122-136. pl. 16, f. 1-6; pl. 17, f. 1-3 and 10-12. pl. 18, f. 1-9. 1892.
- Fries, Elias.** *Pyrenomycetes*. *Summa Veg. Scand.* 418. 1849.
- Fuckel, L.** *Symbolae Mycologicae*, 89-90 and 239-246. pl. 4, f. 1. 1869.
Symbolae Mycological. *Beitrage sur Kenntniss der Rheinischen Pilze*.
Nachtrag II. Mit 1 Lithographirten Tafel. *Jahr. Nass. Ver. Nat.* 27-28: 43, 44. pl. 1, f. 33. 1873.
- Greville, Robert K.** *Scot. Crypt. Fl. IV*: 230. pl. 230. 1826.
- Griffiths, David.** *The North American Sordariaceae*. *Mem. Torrey Club* 11: 1-134. pl. 1-19. 1901.
Contributions to a better Knowledge of the Pyrenomycetes, 1 *A Study of Miscellaneous Species*. *Bull. Torrey Club* 26: 432-444. pl. 365, f. 1-18. 1899.
- Griffiths, David, Seaver, Fred Jay, and Palliser, Helen Letitia.** *Fimetariales*.
N. Amer. Fl. 3: 57-88. 1910.
- Kuntze, Otto.** *Revisio Generum Plantarum* 3⁸: 504, 505. 1898.
- Kunze, Gustav.** *Mykologische Hefte* 1: 15. 1817.
- Niessl, G. V.** *Die Arten der Pyrenomycetengattung. Sporormia* *De Not. Oesterr. Bot. Zeits.* 28: 44 & 96. 1878.
- Peck, Charles H.** *Ann. Rep. N. Y. State Mus.* 28: 64 & 78. pl. 2, f. 14-17. 1879.
Plants found growing spontaneously in the State and not before reported.
Ann. Rep. N. Y. State Mus. 27: 106. 1875.
Species not before reported. *Ann. Rep. N. Y. State Mus.* 49: 38. 1897.
- Phillips, Wm. & Plowright, Charles B.** *New and rare British Fungi*. *Grevillea* 2: 187, 188. pl. 25, f. 1. 1874; 6: 28, 29. pl. 94. 1877.
- Plowright, Charles B.** *Californian Sphaeriae*. *Grevillea* 7: 71, 72. pl. 120, f. 2. 1878.
- Rabenhorst, L.** *Malinvernia* nov. gen. *Hedwigia* 1: 116. pl. 15, f. 4. 1857.
- Rehm, H.** *Ascomycetes* (fasc. XV.) *Hedwigia* 23: 74-76. 1884.

Saccardo, P. A. Fungi Veneti. *Michelia* 1: 373. 1878.

Sylloge Fungorum, *Chaetomium* 1: 220-230; 9: 484-486; 11: 279; 14: 490, 491; 16: 428-430; 17: 600, 601. *Delitschia*, 1: 732-734; 9: 747-749; 11: 317; 14: 558; 16: 506, 507; 17: 686-688. *Hypocopra*, 1: 240-248; 9: 490-493; 11: 279-280; 16: 433, 434; 17: 605, 606. *Philocopra*, 1: 249-252; 9: 494; 16: 434, 435; 17: 606-608. *Sordaria*, 1: 230-239; 9: 487-489; 14: 492-494; 16: 430-433; 17: 601-605. *Sporormia*, 2: 123-132; 9: 816-820; 11: 329, 330; 14: 577; 16: 526, 527; 17: 737-739. 1882-1905.

Spegazzini, Carolo. Fungi Coprophili Veneti. *Michelia* 1: 224-228. 1878.

Winter, George. Diagnosen neuer Pilze. *Hedwigia* 10: 161, 162. 1871.

Exotische Pilze IV. C. Pilze von Cape Horn. *Hedwigia* 26: 16. 1887.

Die Pilze Deutschlands, Oesterreichs und der Schweiz. in Rabenhorst Kryptogamenflora 1²: 162-177 and 179-187. (f. 1-3 and 1-4 page 162). 1887.

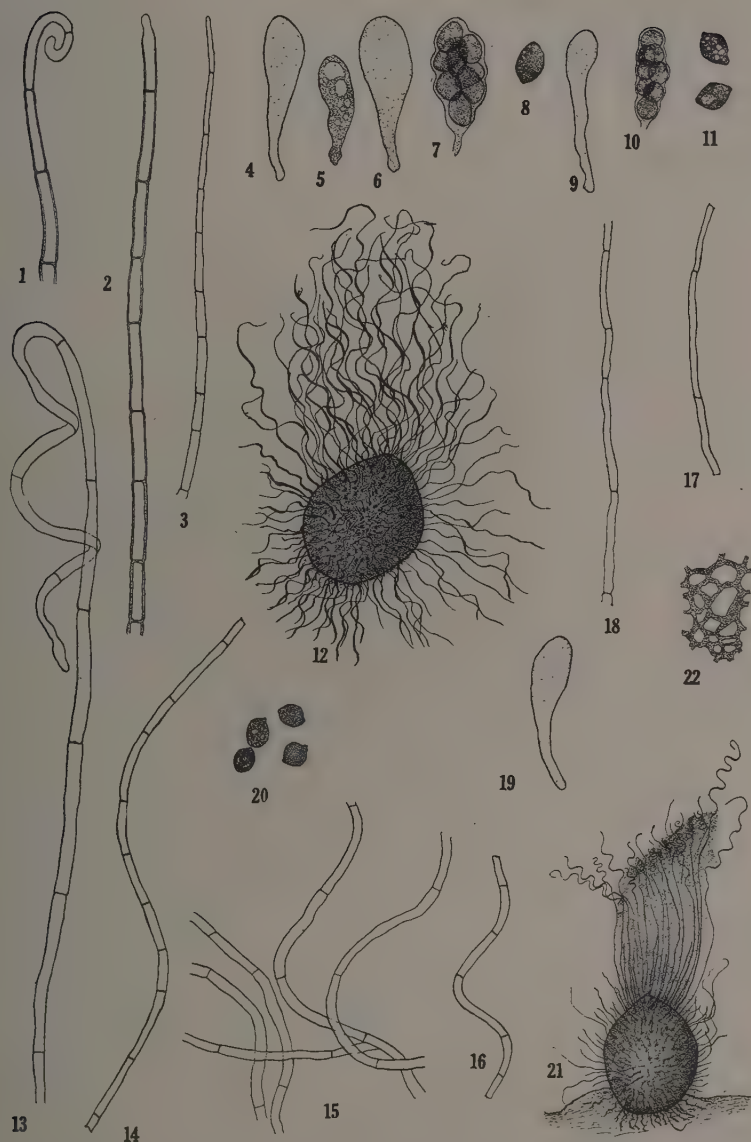
Zopf, Dr. W. Zur Entwicklungsgeschichte der Ascomyceten-*Chaetomium*. *Nova Acta Acad. Leop.-Carol.* 42: 279. pl. 17, 14-26; pl. 18, 1-11; pl. 19, f. 13-20; pl. 20, f. 1-26. 1881.

EXPLANATION OF PLATES

EXPLANATION OF PLATE I.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-8. *Chaetomium murorum*. 1-2. Two kinds of apical hairs. 3. Upper half of a lateral hair. 4-6. Young asci in outline. 7. Spore-bearing part of a mature ascus. 8. A spore.
- 9-11. *Chaetomium olivaceum*. 9. A young ascus. 10. Spore-bearing part of a mature ascus. 11. Slightly immature spores.
- 12-20. *Chaetomium spirochaete*. 12. Perithecium. 13. Apical hair. 14. Portion of a different kind of apical hair. 15, 16. Lateral hairs. 17, 18. Basal hairs. 19. Immature ascus. 20. Spores showing oil globules in some.
- 21-22. *Chaetomium bostrychodes*. 21. Perithecium. 22. A portion of the perithecial wall showing structure.

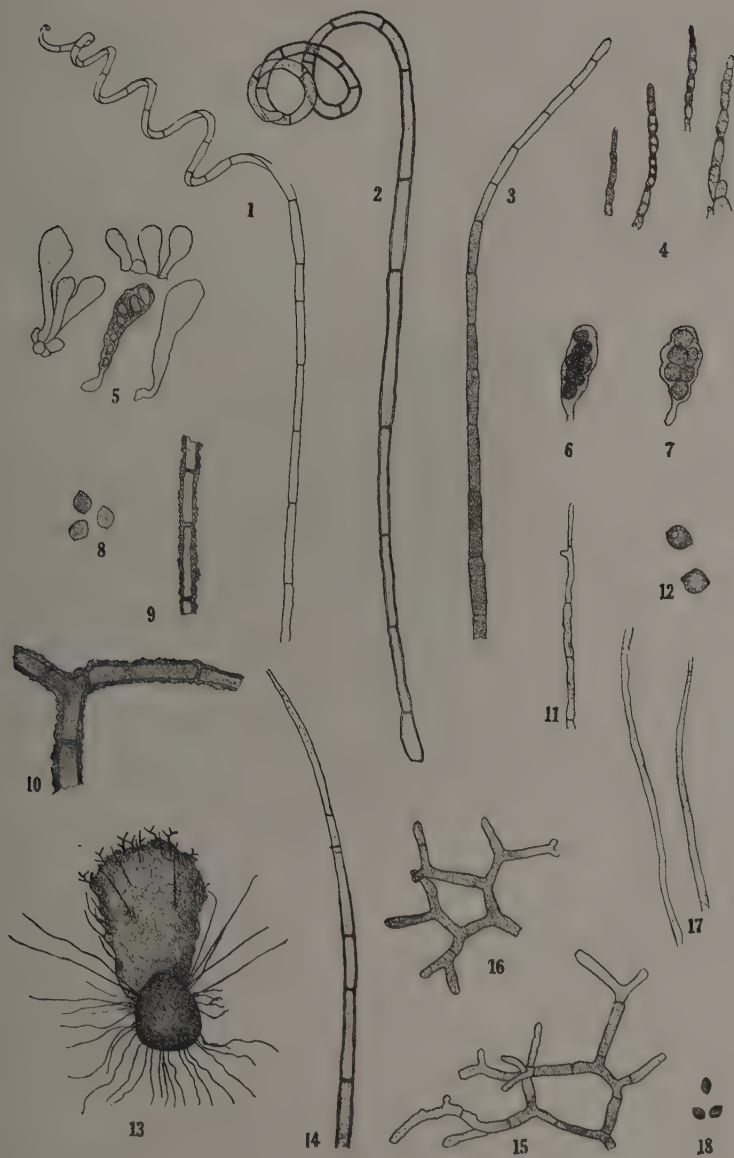


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EXPLANATION OF PLATE II.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-8. *Chaetomium bostrychodes*. 1, 2. Two types of apical hairs. 3. A lateral hair showing the hyaline tip. 4. Paraphyses. 5. Young asci. 6. Spore-bearing portion of a mature ascus. 7. Mature ascus with only six spores visible. 8. Spores.
- 9-12. *Chaetomium elatum*. 9-11. Several sections of an apical hair. 9. Near the base. 10. At the point of branching. 11. At the hyaline tip. 12. Spores, one with an oil globule.
- 13-18. *Chaetomium funicola*. 13. Perithecium. 14. Part of a simple apical hair showing the hyaline tip. 15, 16. Branched hairs. 17. Rhizoids. 18. Spores.

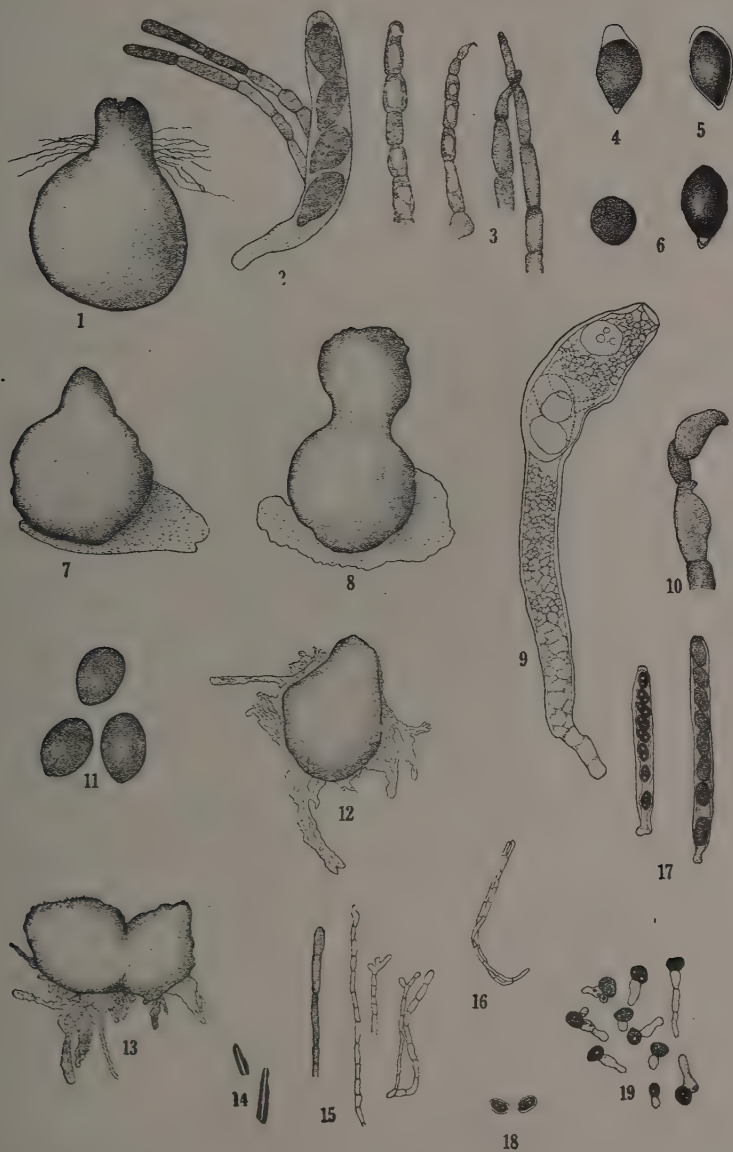


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EXPLANATION OF PLATE III.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-6. *Fimetaria tetraspora*. 1. Perithecium showing superficial mycelium. 2. Paraphyses with an ascus, showing shape and spore-arrangement. 3. Paraphyses. 4. Apical spore of ascus with peculiar enlargement of hyaline envelope. 5. Mature spore. 6. Old spores, end and side views.
- 7-11. *Fimetaria humana*. 7, 8. Perithecia. 9. Young ascus enlarged at the tip, due perhaps to the pressure of the young asci. 10. Apical portion of a paraphysis. 11. Old spores, hyaline envelope having disappeared.
- 12-19. *Fimetaria minima*. 12. Perithecium as observed under the cover-glass with portions of the substratum beneath it. 13. Two perithecia as observed under the cover-glass with portions of the substratum beneath them. 14. Aciculae of the perithecium. 15. Paraphyses. 16. Paraphyses shriveled with two entwining each other. 17. Asci one showing oil globules which are present in the spores of most of the asci. 18. Spores showing the hyaline envelope and two oil globules in each. 19. Spores germinating after 20 hours in water at room temperature.

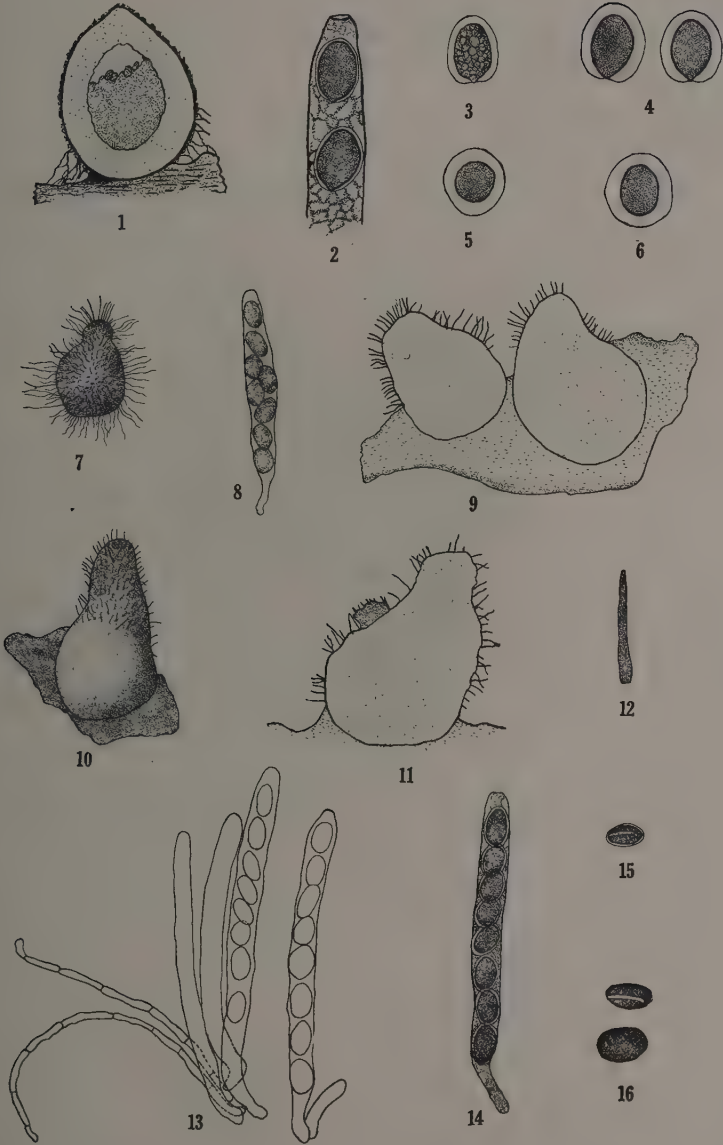


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EXPLANATION OF PLATE IV.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-6. *Fimetaria fimicola*. 1. Perithecium shown as cut on one side showing spores within, mycelium, and the attachment to the substratum. Shaded portion filled with asci. 2. Tip of an ascus showing pore at tip, and hyaline envelope as seen in the ascus, and germ-pore pointed downwards. 3. Young spore, showing hyaline envelope, germ-pore, and three oil globules. 4. Mature spores. 5. Spore end view. 6. Spore seen obliquely.
- 7-8. *Fimetaria pilosa*. 7. Perithecium. 8. Ascus showing spore-arrangement.
- 9-16. *Fimetaria discospora*. 9 & 11. Perithecia in outline. 10. Perithecium. 12. An acicula. 13. Paraphyses and asci in outline. 14. Mature ascus. 15. A spore. 16. Rather large spores seen in one specimen. Thought by some authors to belong to a different species. Seems to be a variation in the same species.

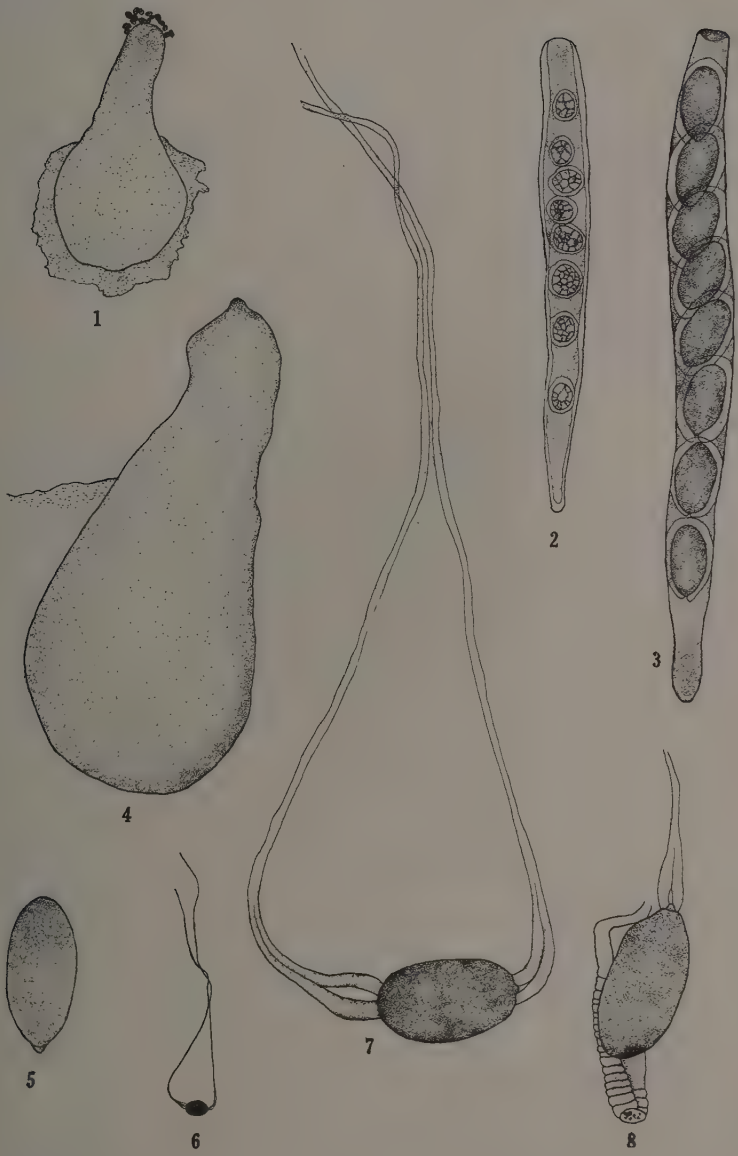


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EXPLANATION OF PLATE V.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-3. *Fimetaria fimicola*. 1. Perithecium with spores escaping. 2. Young ascus.
3. Mature ascus.
4-8. *Pleurage taenioides*. 4. Perithecium. 5. An old spore. 6. Mature spore
X 79. 7. Same X 450. 8. Mature spore showing folds in the primary
appendage.



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EXPLANATION OF PLATE VI.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-10. *Pleurage anserina*. 1. Perithecium with spores escaping. 2. Apical hairs. 3. Ascus and paraphyses in outline X 306. 4, 5. Young asci in outline. 6. Ascus almost mature. 7. Mature ascus. 8. Ascus apex showing cap breaking off. 9. Young spore showing primary appendage with septa. 10. Peculiar mature spore, not a common type.

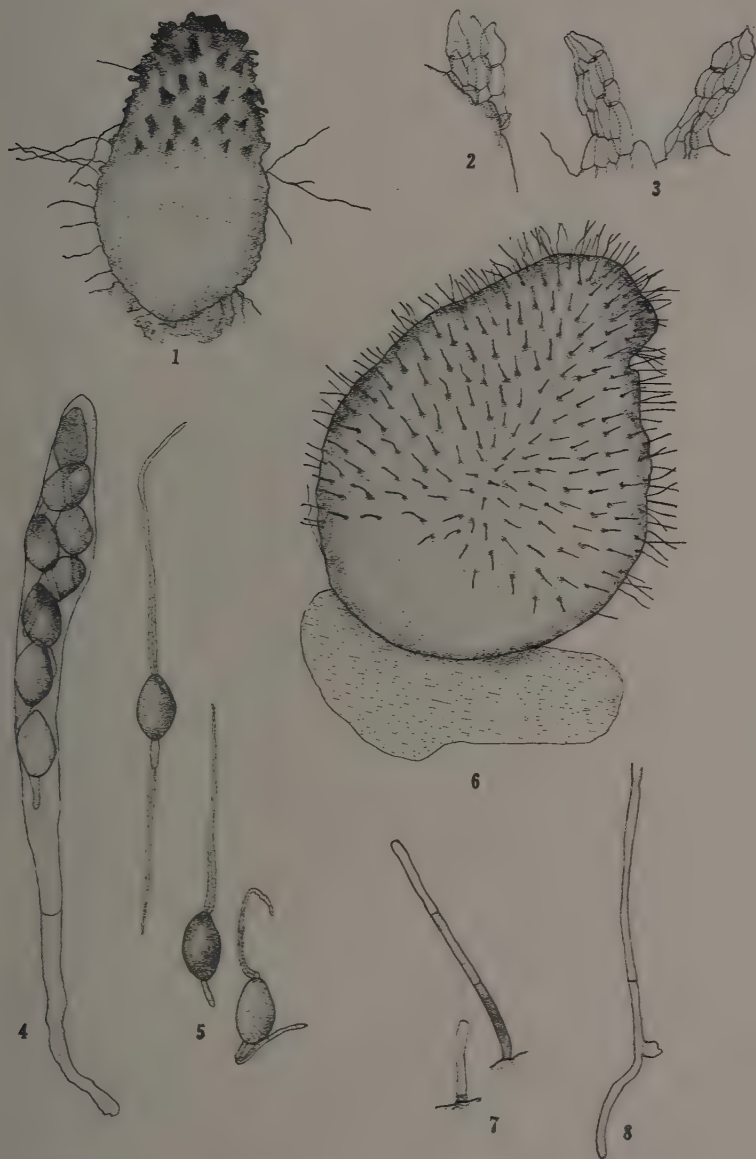


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EXPLANATION OF PLATE VII.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-5. *Pleurage conica*. 1. Perithecium. 2, 3. Agglutinate hairs of the perithecium.
4. Mature ascus. 5. Mature spores.
6-8. *Pleurage amphicornis*. 6. Perithecium. 7. Hairs. 8. Rhizoid.

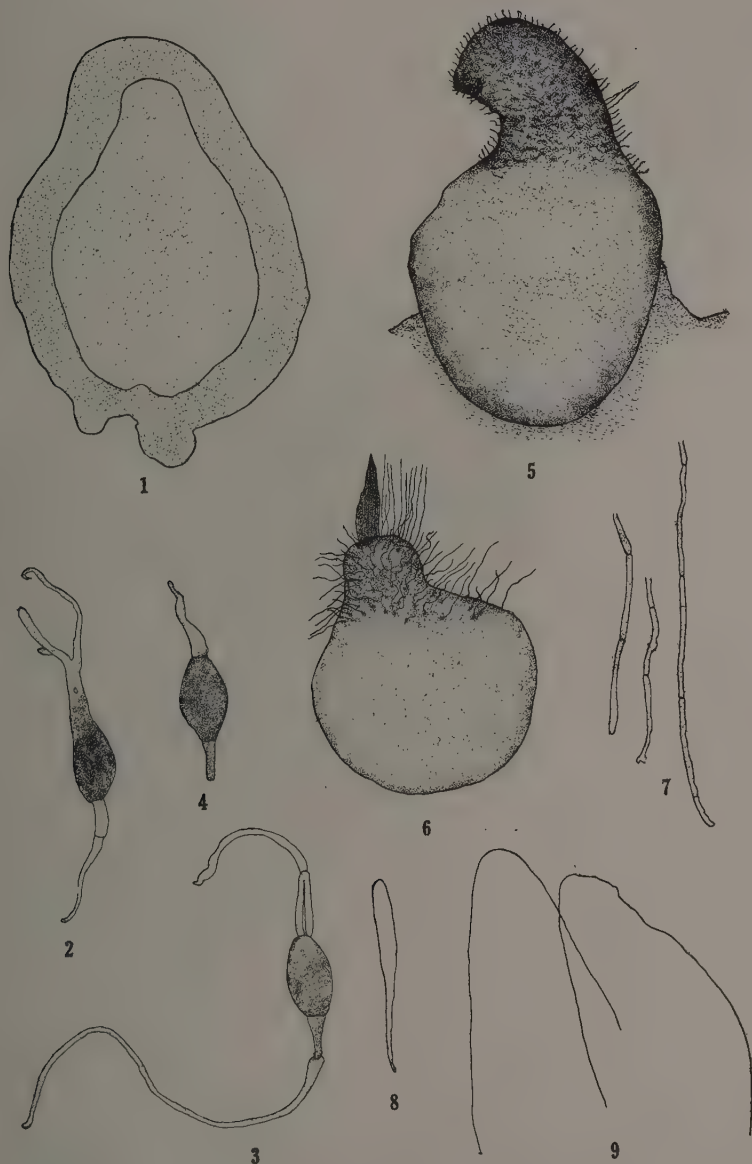


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EXPLANATION OF PLATE VIII.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-4. *Pleurage ampicornis*. 1. Perithecium showing apparent thickness of the wall and the spore area. 2. A young spore. 3. A mature spore. 4. An old spore.
5-9. *Pleurage hyalopilosa*. 5, 6. Perithecia. 7. Rhizoids. 8. Ascus X 79. 9. Outline of upper portion of two asci.

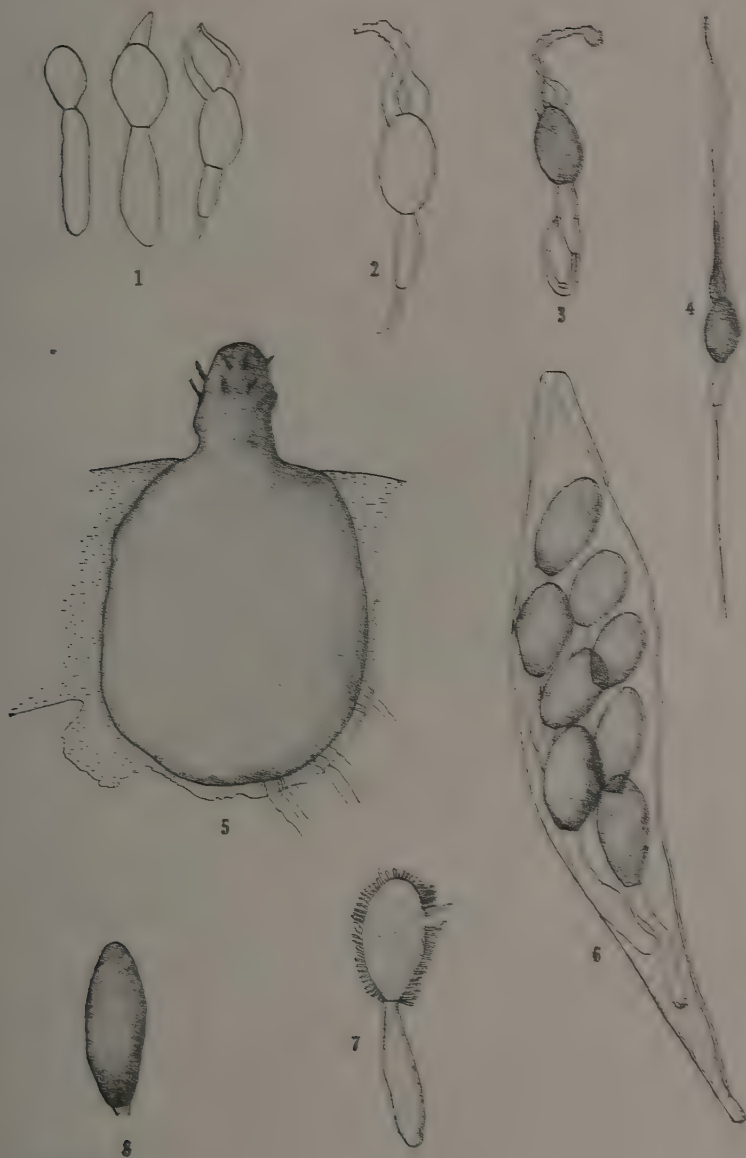


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EXPLANATION OF PLATE IX.

Note. Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-4. *Pleurage hyalopilosa*. 1. Young spores in outline. 2, 3. Older spores. 4. A mature spore.
5-8. *Pleurage immersa*. 5. Perithecium. 6. Ascus showing spore arrangement.
7. A mature spore. 8. An old spore.

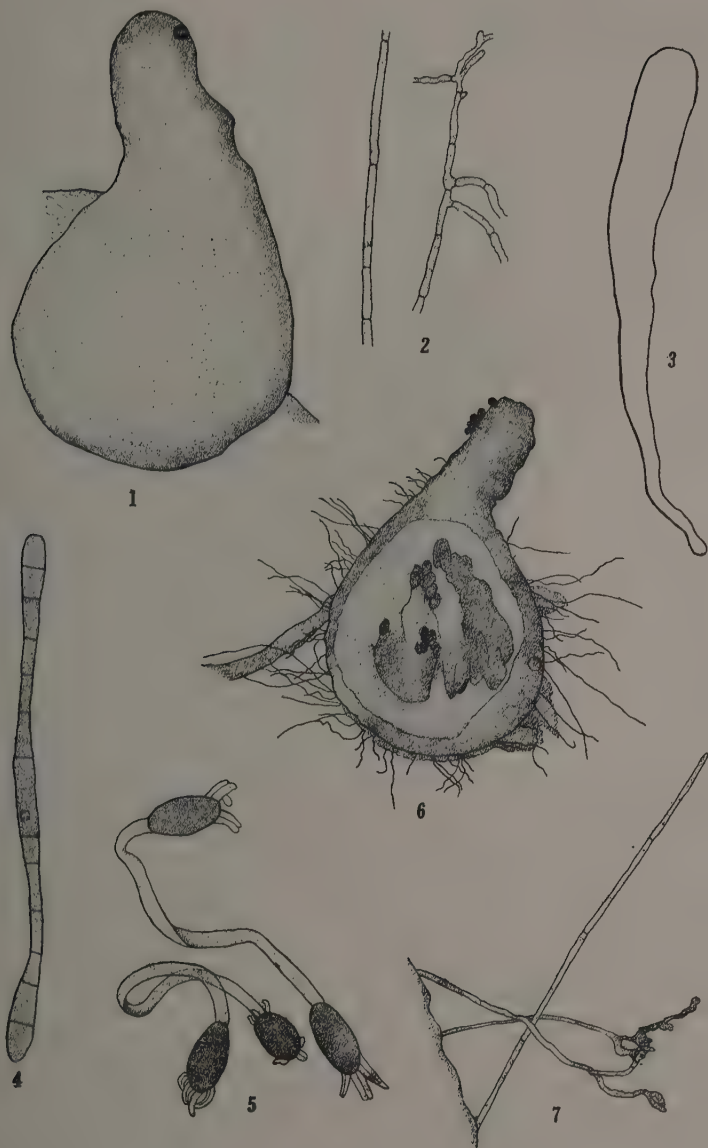


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EXPLANATION OF PLATE X.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

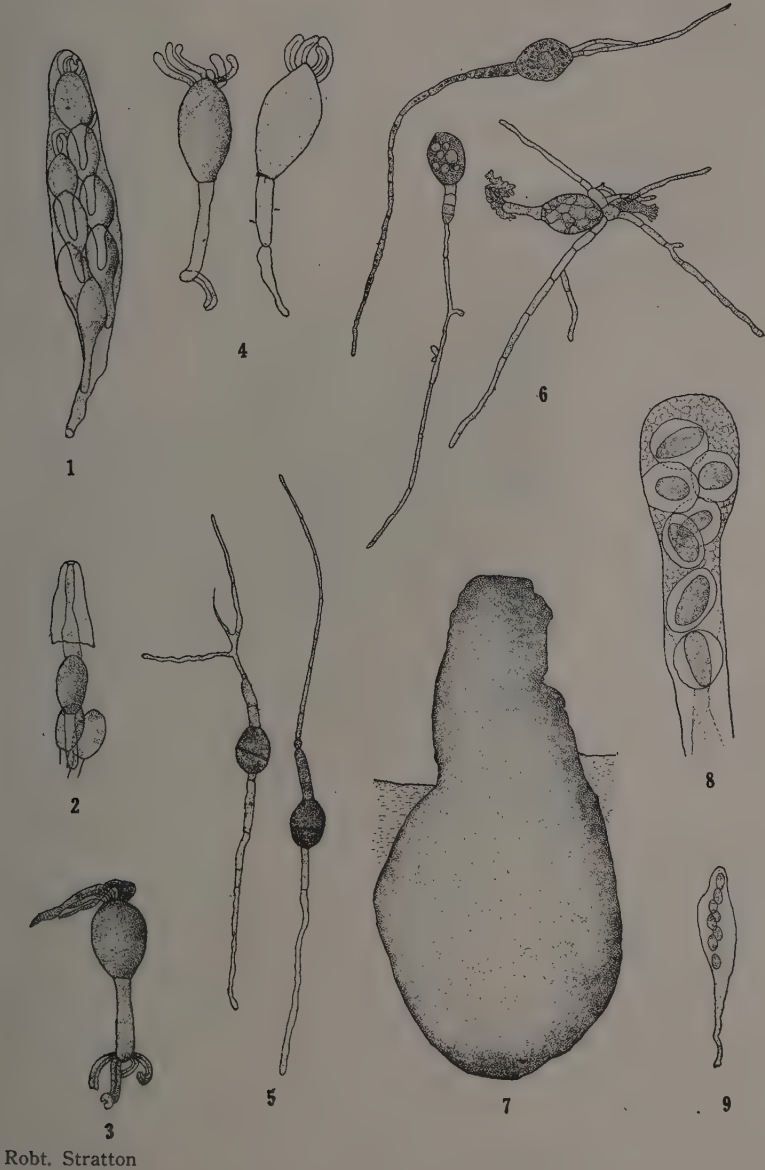
- 1-5. *Pleuraea zygospora*. 1. Perithecium. 2. Portions of arachnoid mycelium.
3. Outline of young ascus X 306. 4. Young spore. 5. Mature spores X 306.
6-7. *Pleuraea vestita*. 6. Perithecium. 7. Rhizoid-like mycelium.



EXPLANATION OF PLATE XI.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-6. *Pleurage vestita*. 1. Mature ascus showing 2-seriate arrangement of spores X 306. 2. Ascus cap showing manner of opening X 306. 3. A mature spore. 4. Other forms of spores. 5. Germinating spores after 24 hours in water X 306. 6. Germinating spores X 306. The two on the left were in water one day the one on the right, two days.
- 7-9. *Pleurage longicaudata*. 7. Perithecium. 8. Tip of a young ascus. 9. Expanded ascus X 79.



EXPLANATION OF PLATE XII.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-3. *Pleurage longicaudata*. 1. Ascus contracted X 306. 2. Upper portion of an ascus expanded. 3. Spores.
- 4-9. *Pleurage multicaudata*. 4. Perithecium. 5. Outer portion of hair-bundle. 6. Mature ascus. 7. Old spore in section. 8, 9. Mature spores.

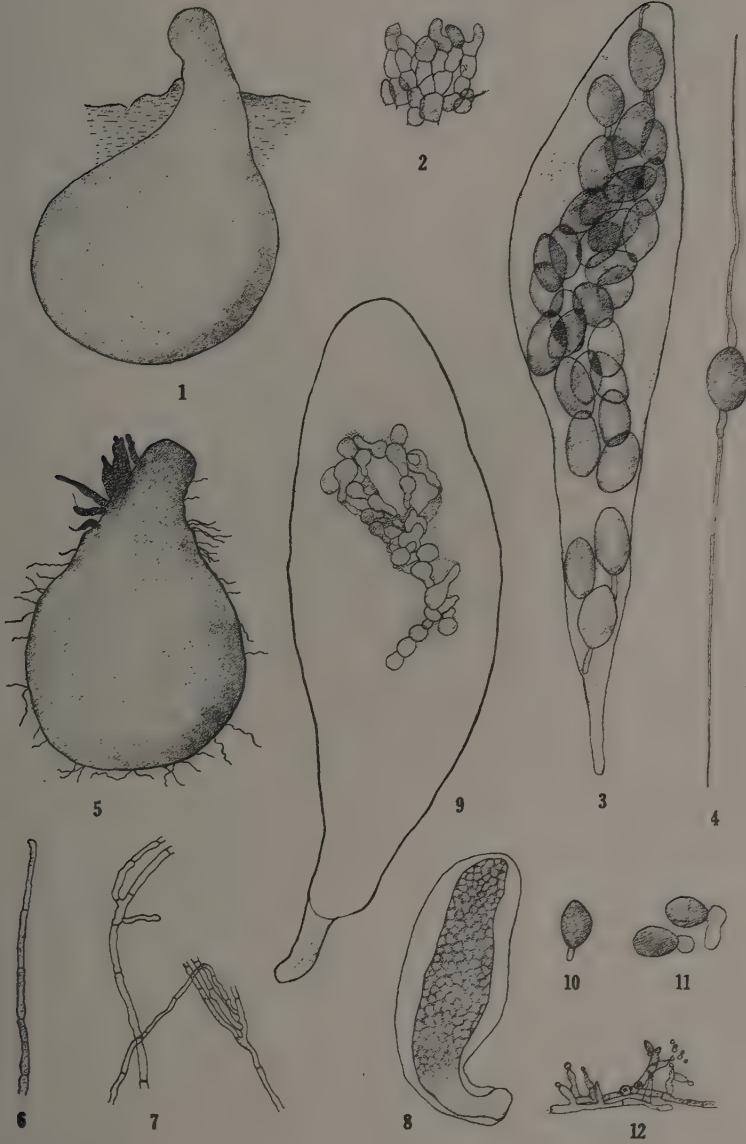


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EXPLANATION OF PLATE XIII.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-4. *Pleurage dakotensis*. 1. Perithecium. 2. Agglutinate hairs. 3. Mature ascus. 4. Mature spore.
- 5-12. *Pleurage curvicolla*. 5. Perithecium. 6. Apical hair. 7. Mycelium from agar. 8. Young ascus with thick hyaline wall. 9. Young ascus showing a few of the many spores forming. 10. A spore. 11. Germinating spores. 12. Conidial stage.

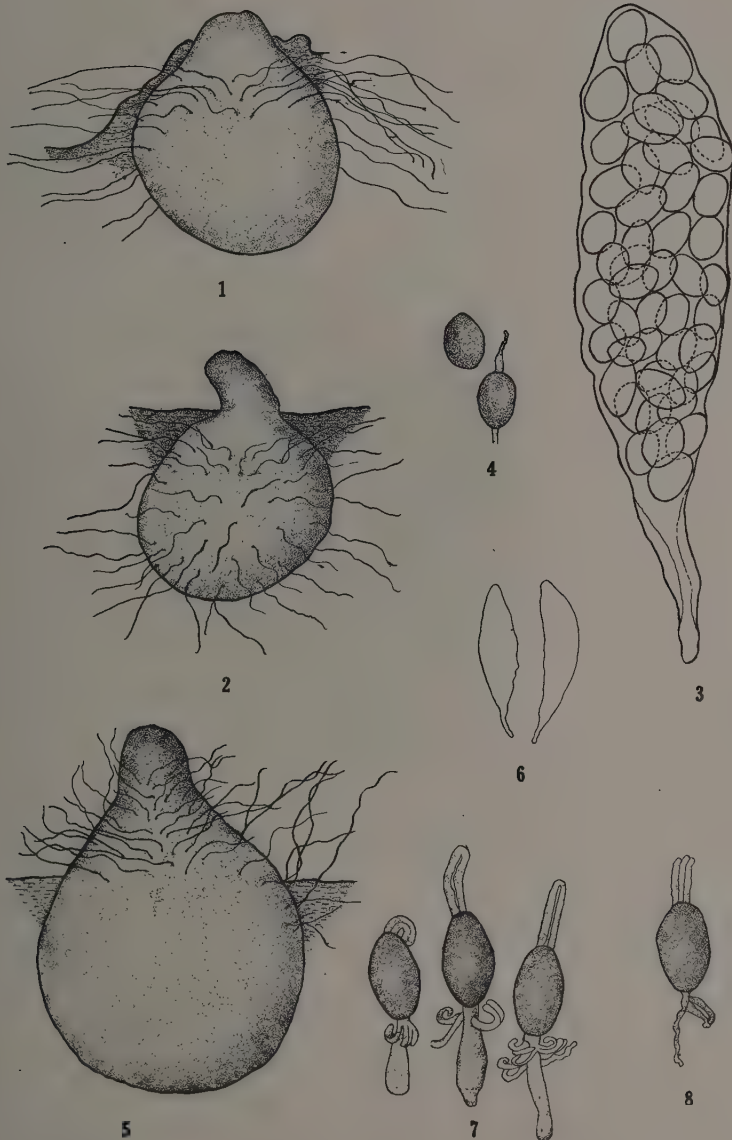


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EXPLANATION OF PLATE XIV.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-4. *Pleurage collapsa*. 1, 2. Perithecia. 3. Old mature ascus shrunk from drying. 4. Old spores.
5-8. *Pleurage pleiospora*. 5. Perithecium. 6. Young asci in outline X 79. 7. Types of mature spores. 8. Spore showing shriveled primary appendage.

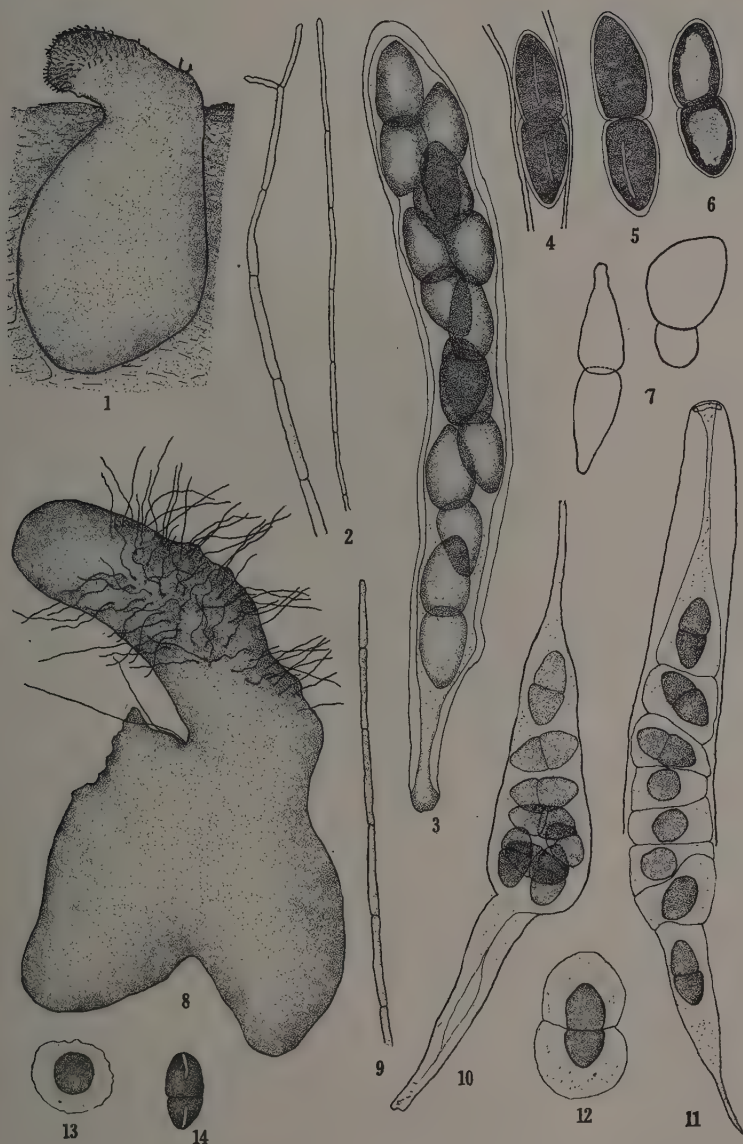


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EXPLANATION OF PLATE XV.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-7. *Delitschia leporina*. 1. Perithecium. 2. Paraphyses, branched and unbranched forms. 3. Ascus. 4. Spore within ascus wall. 5. Mature spore. 6. Immature spore showing hyaline envelope and thick wall. 7. Irregular spore forms in outline.
- 8-14. *Delitschia vulgaris*. 8. Perithecium crushed. 9. Hair of beak. 10, 11. Ruptured asci. 12. Mature spore. 13. Same seen endwise. 14. Old spore showing germ-pores.

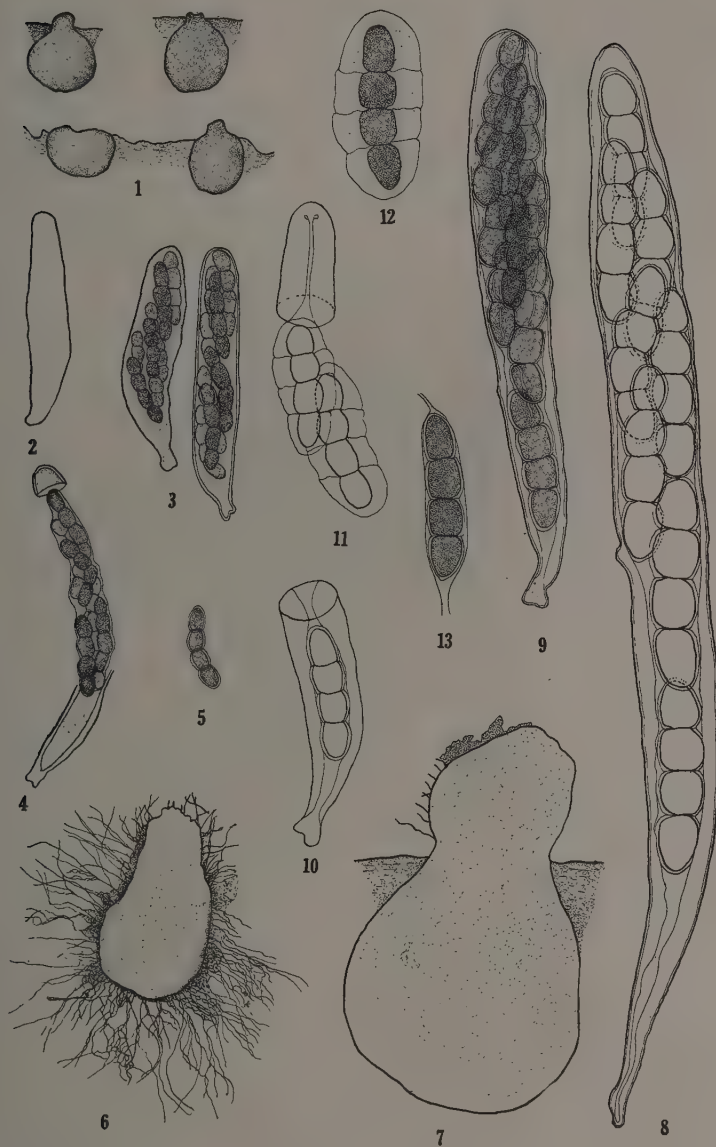


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EXPLANATION OF PLATE XVI.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-5. *Sporormia minima*. 1. Perithecia. 2. Young ascus in outline. 3. Two asci showing spore arrangement. 4. Ascus showing cap and how spores escape. 5. Mature spore.
- 6-13. *Sporormia intermedia*. 6. Perithecium seen in section. 7. Another form of perithecium in outline. 8. Ascus much elongated in water. 9. Mature ascus. 10. Lower portion of an opened ascus with one spore. 11. Cap-like lid of same ascus with two spores. 12. Mature spore with hyaline envelope swollen in water. 13. Spore as seen within inner membrane of ascus.

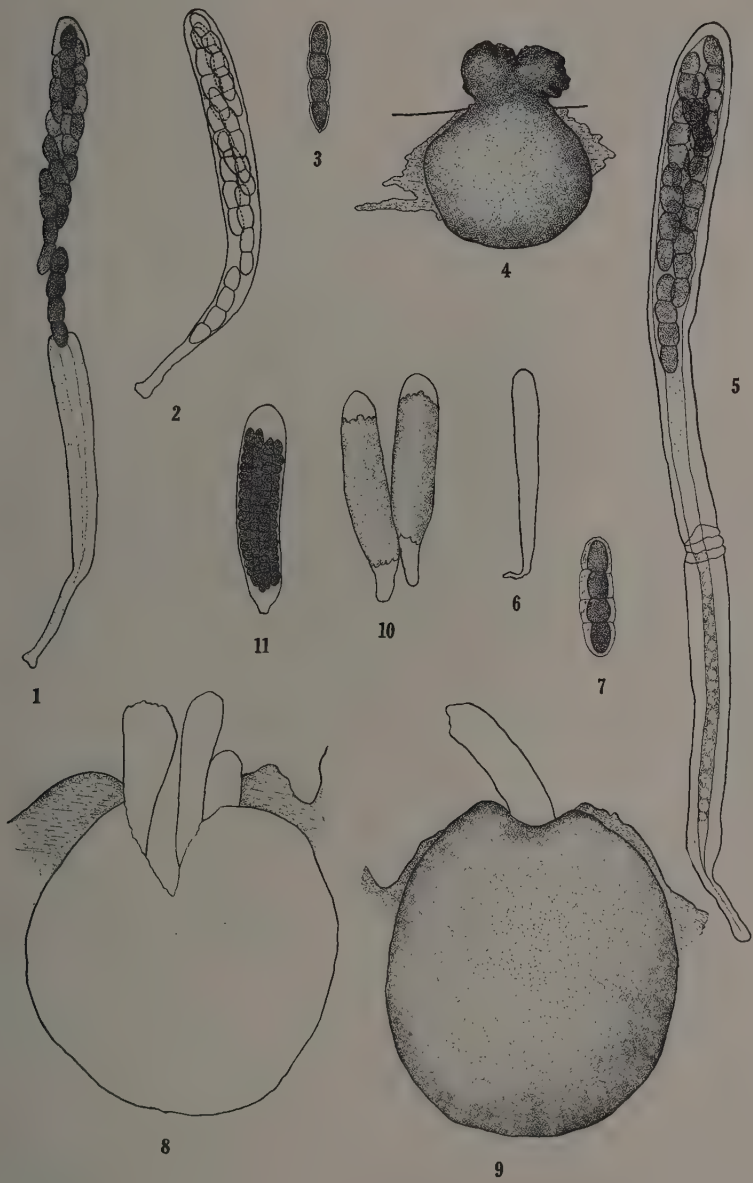


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EXPLANATION OF PLATE XVII.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-3. *Sporormia leporina*. 1. Ascus with spores escaping. 2. Mature ascus in outline. 3. A spore.
- 4-7. *Sporormia tuberculata*. 4. Perithecium. 5. Ascus elongating in water. 6. Diagrammatic sketch of an ascus. 7. A spore.
- 8-11. *Sporormia fimetaria*. 8. Perithecium in outline with asci projecting X 450. 9. Perithecium with ascus projecting X 450. 10. Young asci in outline. 11. Mature ascus.

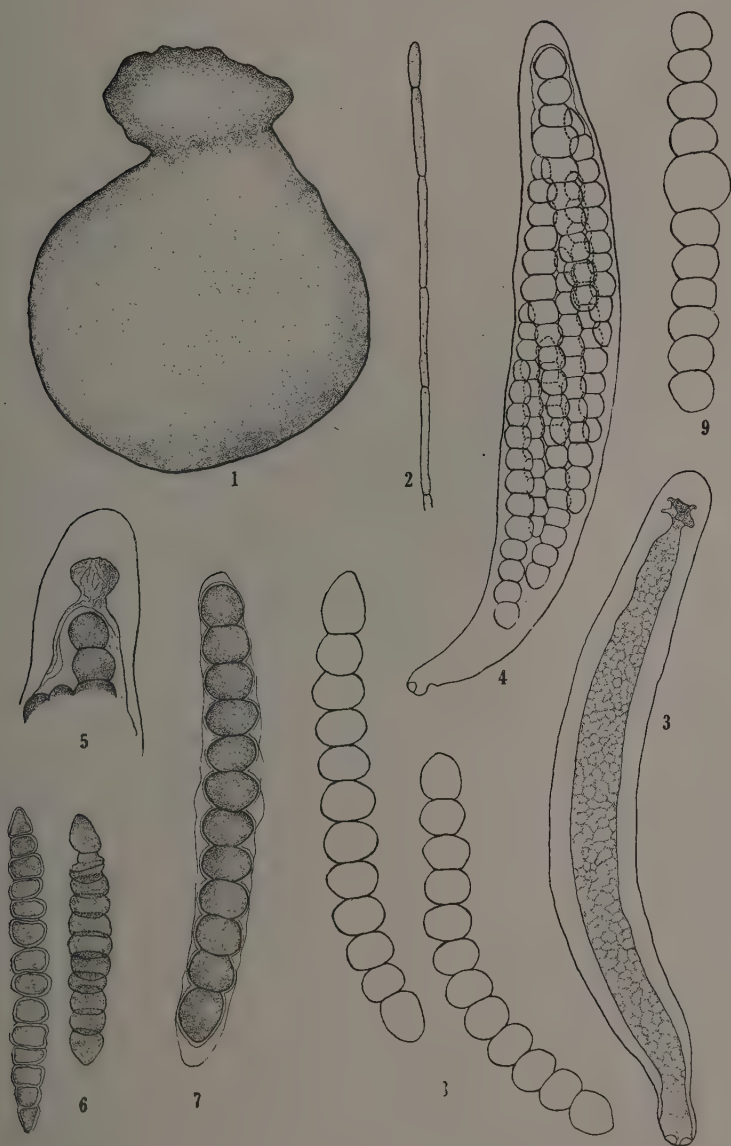


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EXPLANATION OF PLATE XVIII.

Note: Where no magnifications are given an enlargement of 79 diameters for perithecia, and 450 diameters for hairs, paraphyses, asci, and spores is to be understood. The illustrations were drawn from a magnification double that given here and reduced one-half in the process of reproduction.

- 1-9. *Sporormia herculea*. 1. Perithecium. 2. Upper portion of a paraphysis. 3. Young ascus showing thick hyaline wall. 4. Ascus in outline showing spore arrangement X 305. 5. Tip of ascus. 6. Young spores. 7. Mature spore. 8. Other spores in outline. 9. Peculiar apical spore of ascus.



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(The technical descriptions of the genera and species are indicated by **bold-face** numbers. Synonyms are in *italics*.)

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